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The Farmer's Digest

Fort Atkinson, Wisconsin

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The **Farmer's Digest**

Volume 19 December 1955 **Number 6**

CAN I AFFORD A BULK TANK?

Facts and figures you can apply to your own dairy farm . . .

Condensed from Michigan Farm Economics

R. G. Wheeler and C. R. Hoagland

MANY dairymen faced with the need of deciding whether they should shift over to this new system are asking the question "Can I afford the large investment necessary to change from can-cooling methods?"

The answer of course, will vary from farm to farm, depending upon such factors as the amount of milk produced, the design and use of the bulk-tank installation, related adjustments in management of the farm, alternative market outlets, and changes by milk receivers in operating and pricing methods.

Additional Outlays and Savings

The price of a tank and compressor will range from upwards of $3,000 for an installation of 500 or more gallons capacity to as low as $1,200 for a small unit. Group buying of tanks by producers' organizations offers the possibility of saving 20 to 30% on list prices.

The initial outlay on a number of farms will also include expenses for milk room alterations and for providing increased electrical service. The net additional investment will be lower than the total installation cost on farms where existing coolers can be traded or where new can coolers would otherwise have to be purchased.

On most farms, the chore routine will be affected only to the extent that the farmer will strain milk directly into the tank instead of into cans that must

Reprinted from Michigan Farm Economics, Michigan State College, East Lansing, Michigan

be lifted in and out of a cooler. Unless a pipe-line milker is installed, the time needed for dairy chores will probably change only slightly. In a few cases, extra efforts may be needed in maintaining a passable road to the milkroom. Somewhat more electrical power will be consumed, because bulk milk is ordinarily cooled to lower temperatures than milk in cans. Some dairy farmers may need to invest in a large hot water heater. On the other hand, the expense of providing milk cans will be eliminated.

A distinct advantage of the bulk tank system is that producers are paid for the total weight of milk recorded in their tanks. Thus, they avoid the loss of milk that is spilled in assembly or which remains in cans after dumping into weigh tanks at receiving stations. A conservative estimate of these losses is one-half of one per cent of all milk collected in cans. In some cases, the loss of butterfat may be even more than proportional to the loss of milk. Altogether, however, these changes affecting the receipts and expenses of the farm business will generally be of limited importance as compared with the additional investment in bulk handling facilities.

Effect on Return, 20-Cow Herd

To illustrate the impact of a shift to bulk handling on a particular farm situation, take the case of a 20-cow farm selling an average of 500 pounds of milk daily, and presently using an eight-can cooler that has at least 5 remaining years of useful life. The dairy herd is not large in relation to the total acreage of the farm, and the operator has a son who may want to become a partner in the farm business within 5 or 10 years. Thus, although a 150-gallon tank might provide a bare minimum of reserve capacity under alternate-day pick-up of the present production, the operator would probably be wise to purchase at least a 300-gallon tank to allow for possible future expansion. If he buys the larger tank, trades in his present cooler, and installs 220-volt wiring in his milkroom, his net additional investment will be about $2,400.

The poor stork—he's always getting blamed for a lot of things some other bird is responsible for.

Assuming that this dairyman uses bulk cooling and receives a net price 10 cents per hundredweight higher than formerly, annual receipts from the present volume of milk sold will increase by $182 (see figures for Farm A in table). Receipts will also include at least $35 for milk formerly lost in shipment and expenses for can maintenance will

be reduced by about the same amount. Other changes in expenses on this farm will be of minor importance. The sum of the additional receipts and reduced expenses will be large enough to amortize the net added investment, with interest at 5 percent, in about 13 years. If the operator buys on the installment plan with a 25 per cent down payment, however, he will find his monthly payments over a 3-year period to be more than twice as large as his additional current income.

Another way of looking at this problem is to ask how much of a premium would be needed to provide for 10-year amortization of the added investment, after allowing for other changes in receipts and expenses. In this case, the answer is about 13 cents per hundredweight.

Changes in Investment, Expenses and Returns Resulting from Bulk Tank Installations on Three Farms

Item	Farm A	Farm B	Farm C
	Number of Cows		
Size of herd	20	35	12
	Dollars		
Net Additional Investment	2,400	2,800	1,800
	Dollars per year		
Additional receipts			
Premium on present milk sales (estimated at 10c per cwt.)	182	365	110
Pay't for milk formerly lost ..	35	70	20
Reduced expenses			
Can Maintenance.	37	73	22
Additional Current Income	254	508	152
	Years		
Time required to Amortize Investment from added Income (5% interest)	13	6½	18½

35-Cow Herd

Farms with larger dairy herds, of course, usually have more chance for gaining from bulk handling. This can be illustrated by considering the case of a 35-cow farm selling an average of 1,000 pounds of milk daily, and presently using a 16-can cooler which has almost 10 years of remaining useful life.

The operator of Farm B has no intention of expanding cow numbers much beyond the present level, so a 400-gallon tank will provide considerable reserve capacity for seasonal variation even under alternate-day pick-up. Purchase and installation of such a tank will involve a net additional investment of about $2,800. On this farm, as on Farm A, there seems no reason to expect any substantial change in use of labor and electricity or in repair expense with a shift to bulk cooling. Expected changes in milk sales and can maintenance expense appear in the table. This operator can amor-

tize the added investment with the additional income of the first 6½ years. If he intends to buy on the installment plan and make his monthly payments from the additional receipts and reduced expenses of his first 3 years, however, he will have to make a cash down payment of about 50 per cent, to be recovered only gradually beginning in the fourth year. The minimum premium necessary to permit a 10-year amortization of the net additional investment would be 6 cents per hundredweight.

12-Cow Herd

Of course, only a small proportion of all farms selling fluid milk have as many as 35 cows. A common problem is that of a 12-cow farm, selling an average of 300 pounds of milk daily, and now using a 6-can cooler which will soon have to be replaced. This operator might find a tank of only 100-gallon capacity large enough for the time being, but to allow for seasonal variation in herd size, he would probably be wise to purchase a 200-gallon tank. Such a tank would sell for $1,800 to $2,200, less an allowance for trading in the present cooler. Installation expenses and associated changes in milk room facilities would probably add $300 or more to the total initial outlay. On the other hand, purchase of a bulk tank will eliminate the need for buying a $500 can cooler at an early date. Thus, the net additional investment on Farm C will probably not exceed $1,800.

With a premium of 10 cents per hundredweight for bulk delivery and with milk sales figured on volume at the farm instead of at the plant, annual receipts will be increased by about $130. Can maintenance expense of about $22 a year will be eliminated. These gains are not large enough however, to meet 10-year amortization payments on the additional investment of $1,800. Instead, a period of nearly 20 years would be required.

To meet 10-year amortization payments out of additional current income, with total herd production remaining unchanged, this operator would need to receive a premium of about 17 cents per hundredweight. Even with such a premium, of course, his additional income during the usual term of an installment contract would pay for only a small fraction of the new investment.

Installing a bulk tank may be the only way for this operator to avoid losing his fluid milk market. Otherwise, he obviously has little to gain, incomewise, from bulk handling unless he can also increase total milk production.

Can We Self-Feed Silage to Cattle, Free Choice?

In England, they're trying all-silage feeding of dairy and beef cattle . . .

Condensed from the Agricultural Review

Charles Turner

THREE seasons ago the self-feeding of silage was started on a small north Bucks (England) farm. From time to time results, have been recorded and published. Interest has been widespread—in fact, it is difficult to recall any new development of recent years that has made a greater appeal to the farming community. Visitors and inquiries have come from all parts of the country and reports are continually coming of the adoption of the system in many countries.

It seems that there are two main reasons for this interest. The majority of farmers now feel that haymaking, as a means of conservation, leaves much to be desired—in particular, that it is not in keeping with our improved meadows and better grassland management. Silage making is surer and, in view of the present labor position, self-feeding has a special appeal.

Most of the work on self-feeding has been done with milking cows. Yields of over 1,000 gallons have been obtained, without any concentrates, from cows whose diet, during four winter months, has consisted solely of silage. The average daily consumption of silage in the herd in question was approximately 130 lb.

With the technique of self-feeding—all cows having free access to the silage for 24 hours per day—it is extremely difficult to determine whether the higher-yielding cows have a markedly higher intake of silage than the average. In fact, the system implies that the herd is treated as the unit rather than as a number of individual cows.

Bulk Control Not Possible

Every ton of silage provided for a day's maintenance of 24 cows plus thirty gallons of milk. An attempt was made to feed concentrates individually to the freshly-calved higher-yielding cows. But bulk control is not possible under the system (and,

Reprinted by permission from the Agricultural Review, Liverpool, England

indeed, is not desirable), and the final result was that the cost of the concentrate was only just met by the value of the increased quantity of milk obtained.

Several of the cows calved down with daily yields of 50-70 lb. The lactation curves for the winter-calving animals were steeper than normal, a levelling-out of the curve occurring at about 40-55 lb. of milk per day. The main point of interest, however, was the wide range in lactation from about 4,000 to nearly 11,000 lb.

It is clear that, with unlimited access to exactly the same food, some cows are much more efficient than others as convertors of forage into milk. Yield per cow is of less importance under these conditions than food cost and labor input.

But yields need not be low; eight cows out of the twenty-four, with no concentrates, gave twelve-month yields of over 9,000 lb. Selective breeding will obviously be required to build up a herd of first-class forage converters.

Very satisfactory live-weight gains have been obtained in finishing strong cattle for beef, and self-fed silage seems to be a possible means of increasing the supply of out-of-season beef—one that would compare favorably in cost with autumn-finished grass beef, cold-stored for winter use.

There is some evidence that, for spring calving beef cows, the level of nutrition of the dams, self-fed on silage, is too high, tending to produce scour in the calves. After the calves are old enough to take a large supply of milk, this should not occur; but a lower level of feeding would appear to be indicated for cows with very young calves at foot.

Young beef or dairy stores do well on self-feeding. By themselves they cannot graze silage to a height of more than four feet; but herds on self-feeding are presumably contented because food is available at all times. The mixing of different age groups and sizes is possible.

The technique of self-feeding is simplicity itself. It goes without saying that the silage must be of good quality; in this connection, uniform fermentation is of special importance. With material of variable quality and palatability, there is selective grazing at the silage face.

To obtain the full benefits of self-feeding, the animals should have free access to the silage 24 hours per day. The 'grazing face' (width) required under these circumstances is from six to nine inches per animal. Some of the cattle will be found feeding at any hour of the day or night.

Some control of quantity can be obtained by making a cut over the clamp; this should be about

6½ ft. high, about 4 in. back from the face, and 6 in. deep. The cut material can be easily moved by the cattle, and as they do so, the silage underneath is loosened.

The whole face can be grazed, evenly and without waste, down to ground level. If the cut is made further back from the face, more material is loosened with a corresponding increase in consumption. Control by limiting the period of access is impractical; it would necessitate a long feeding face (about 2 ft. 6 in. per animal), and a loss of freshness in the exposed silage. Under such conditions secondary fermentation occurs, giving variable palatability and selective grazing.

Length Varies With Density

The maximum grazing height for long material appears to be about 6 ft. 6 in. and the length of 'face' required varies with the density of the material. Tightly-packed material is grazed in small mouthfuls.

One experienced farmer strongly maintains that there is less waste through self-feeding than where the silage is cut and carried into the cowshed. It is only when loose material—hay, straw, or silage—is fed that waste by treading occurs.

With types of silage that are easily pulled—e.g. lacerated or chopped material—some form of movable feeding gate or an electric fence may be needed to control the animals. This should be set some 18 in. or 2 feet back from the face.

The writer believes that all silage will eventually be made from short material. Handling and fermentation control are both easier, and the shorter the material, the greater the height to which it can be self-fed. In America, by the use of very short-cutting forage harvesters, self-feeding with feeding gates is reported to be satisfactory in pits up to ten feet in depth.

Of greater importance than the techniques of self feeding are the effects on management and farm policy. The place for self-feeding, in the writer's opinion, is chiefly on heavy-land farms where, if production from the grass is to be maintained in the following season, cattle have to be kept off the land during the winter months.

With an average consumption figure of the order of 1 cwt. per cow per day for the four or five winter months, it is obvious that a large tonnage will be required. The production of a large supply involves considerable reorganization of methods of making; otherwise the saving of labor in the winter may be more than offset by the extra summer work.

10 Tons Per Acre

Increased yields can be obtained by increased fertilizer ap-

plications, and ten tons of made silage per acre is a reasonable target.

Much can be done by time and motion studies of silage-making to increase output per man hour. By the application of this technique, together with some minor alterations to existing equipment, one co-operating farmer increased his output per man sixfold, and the higher output was achieved with a substantial reduction in physical effort.

If we are to obtain increased production from silage, the first objective must be a drier silage—at least twenty-five per cent dry matter. Over most of the British Isles this objective necessitates a roof to keep out water, not only during winter, but also during the period of filling. There is much avoidable waste of valuable material in outside pits and clamps.

Self-feeding in the open usually requires the concreting of quite large areas, especially in the case of dairy cows. With beef animals, self-feeding directly on the soil and in the open has been successfully practised, but the case was that of a large arable farm where there were unlimited supplies of straw.

Provide A Roof

In many cases it is cheaper to provide a roof than to lay the required area of concrete. Several farmers are now building self-feeding silage clamps in Dutch barns with straw and hay storage above the silage and with cattle shelters in a lean-to alongside.

It is advisable that the minimum width of any enclosed space in which self feeding is to be practised should be twenty feet. Even greater width is preferable in order to permit free movement of the cattle to and from the face.

HOW TO GET RID OF A STUMP

Stumps in a lawn, golf course or open field can be a great nuisance. Their removal by mechanical means or explosives is not always practical. Now, an English farm magazine suggests that saltpetre and paraffin can solve the problem. Here are their instructions. To dispose of the tree stump without blasting or bulldozing, bore a hole 2 inches in diameter and 18 inches deep, put in 1½ ounces of saltpetre (potassium nitrate), fill with water and plug up tight. In about six months put in the same hole a half pint of paraffin oil (kerosene) and then light. The stump should smoulder away, without blazing, down to every part of the root. If the stump is very large make two holes and follow the same procedure.

5 YEAR PASTURE PLAN

This plan for reseeding 1/5 of your total grassland each year gives you five permanent pasture strips in different stages of growth for a well balanced pasture throughout the year . . .

Condensed from Breeder's Gazette

IT'S easy to neglect pasture. When fields look green and healthy, you're always tempted to let them go another year or two. But pasture neglect cuts right into the heart of profits on a livestock farm. Permanent pasture grazed for 10 or 15 years without renovation may not be producing one-fourth its potential.

That's the conclusion researchers at Dixon Springs reached after a prolonged study of 60 acres of pasture in Southern Illinois. According to H. A. Cate, First Assistant at the Station, the study brought out these points:

1. Productivity of pastures is closely linked to the life of legumes in the stand. Legumes provide summer grazing when the grasses are slow growing. They supply needed protein for livestock, and return nitrogen to the soil. But they are short-lived, and must be renewed periodically.

2. Pastures seeded with grasses and legumes are most productive in the 2nd, 3rd and 4th year after seeding. After that legumes begin to disappear.

3. It is most practical to renovate pastures according to a 5-year plan. A fifth part of your pasture is reworked each year and resown with a basic seeding mixture.

4. Renovation requires a completely new seedbed, properly fertilized. Half tillage is not enough.

5. Good grazing practices increase total profit. This means turning the animals on pasture at times when the forages offer the most gain, alternating grazing to allow for plant recovery, and using high quality livestock.

The 5-year plan offers substantial advantages. Renewing 1/5 of your pastures is a lot easier and more practical than tearing up and reseeding all of it at once. Chances of loss caused by seeding failure in any one year are reduced. Renovation can be scheduled as a regular job for a slack period every year. And you always have five pasture strips

Reprinted by permission from Breeder's Gazette, Spencer, Indiana

with different plants predominating and with each field providing good grazing at different seasons.

To make such a variety possible, Dixon Springs used this basic mixture:

Seeded in Fall per acre

1 bu. Rye
2 lbs. Timothy
2 lbs. Redtop
6 to 8 lbs. Orchard Grass or Fescue

Broadcast in Spring per acre

3 lbs. Sweet Clover
3 lbs. Red Clover
7 lbs. Korean lespedeza
1 lb. Ladino clover

This mixture produces a succession of predominant plants throughout the 5-year period. Rye and Lespedeza predominate the first year; Red Clover, Sweet Clover and grasses the second year; Ladino and grasses the 3rd and 4th year, and grasses alone the 5th year. With 5 strips of different ages, all of these plants are at the peak of their growth in one of the strips to provide a well rounded forage diet for stock.

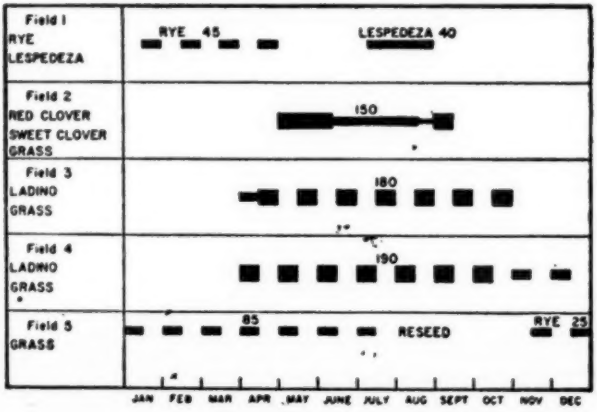
Take a look at the 5-year pasture calendar at the bottom of this page. For fall and spring grazing you have Rye or Winter Cereal. As the grasses fall off in mid-summer, Legumes are more abundant. In late summer, Lespedeza supplements deficiency in other plants. The period of heavy production on most of the strips comes in May and June when excess can be cut for hay or silage.

On the strip in its fifth year, where grasses predominate, heavy grazing is recommended. Since this strip is not to be renovated,

---

Pasture Calendar on 5 Year Plan

With one field renovated annually, your 5 pastures always provide varied forage. Field 1 is in its 1st year, Field 2 in its 2nd year, etc. Bars indicate quantity of predominate plants each month. Numbers show animal-unit days per acre.



overgrazing is not a problem.

Maintaining soil fertility at a high level is most important in this plan. Before the renovation of each strip, the soil should be tested and limestone, potash and phosphate applied according to the need indicated by the test. Disc these fertilizers into the soil before seeding and use a starter at seeding time such as 4-16-16 at the rate of 200 to 300 lbs. per acre. Established pastures should be top-dressed annually with the equivalent of 200 lbs. of 0-20-20. Nitrogen can be applied to grass pasture only at the rate of 40 to 50 lbs. per acre.

Grasses should be seeded in late August to mid-September to produce well-grown plants by winter. If Alfalfa is used it may also be fall seeded, with other legumes broadcast in late February and early March.

A light seeding of cereal grain can be planted with the grass in the fall to provide a quick cover and form a protective mulch for the grass. These grains, especially Rye, supply good fall and spring grazing.

Mr. Cate points out that good grazing management is essential to keep all pastures productive and profitable. Stocking should be regulated so that the various pasture strips are grazed when they offer the most gain, but care must be taken to prevent the plants, especially the legumes, from being grazed beyond recovery.

Grasses produce the most gain if grazed in spring and fall when they are low in fiber and high in protein. Their value in summer is limited except to maintain mature animals and aid in preventing bloat. Legumes provide the best forage in late spring and summer. However, the summer carrying capacity of all 5 strips is less than that of spring, and stocking rates must be adjusted unless supplements are provided.

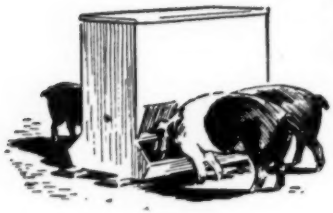
Bloat is less likely to occur with a good stand of grass. A 50-50 mixture of grass and legumes is desirable but hard to maintain. Different kinds of fertilizers can help. On soils of low fertility, superphosphate and nitrogen favor grasses, rock phosphate and potash favor legumes.

Pastures should be stocked heavily enough to consume the grass before it makes seed. This allows the legumes to come on and make good growth.

Legumes should not be grazed closer than 3 to 4 inches, with your livestock then rotated to allow recovery. Light grazing between September 15 and frost will encourage root development.

This program was developed for southern Illinois, but the basic idea will prove successful in almost any area — substituting plants and seeding periods adapted to your local conditions.

HOGS RETURN STEADY INCOME



He sends an even flow of hogs to market every year . . . has built production to fit his farm . . .

Condensed from The Ohio Farmer

Delmer E. Groves

THE bumper crop of 101 million pigs predicted for 1955 will put some hogmen out of business. Long after these "inners-and-outers" are no longer raising hogs, Robert V. Snyder will likely be producing about the same number he's been turning out for the past decade.

This Clinton County, Ohio, hogman is that kind of producer —as steady as the day is long. Of course, he's hoping to increase efficiency from year to year, just as he has in the past.

Snyder is a man who figures things out for himself, using the best advice available while doing so. His hog system makes maximum use of labor and equipment and fits his farm to a "T." It allows him to put the latest and best hog-production principles to practical use. Year in and year out, he'll make some money on hogs if anyone does.

Two litters are farrowed each year from 50 sows. The sows are bred in two groups so that farrowings are about evenly divided among the four months of February, May, August and November. Not only does this scatter the work load but it gives Snyder year-around income and evens out his chances of hitting the market during "seasonal lows."

Snyder has fenced 128 acres into four rectangular fields, each containing 32 acres. A lane 2300 feet long separates each pair of fields. Any section of any field can be reached from one of the lanes.

The fields are in regular crop rotation which provides a meadow for hog pasture each year. The meadow mixture is four pounds of alfalfa, four pounds of red clover, ½-pound Ladino clover and 3-4 pounds of timothy sown either in fall or spring.

The first year after seeding this is used for hog pasture. The second year it is used for beef cattle pasture and hay. Meadows are top-dressed either after harvesting wheat or following the

Reprinted by permission from The Ohio Farmer, Cleveland, Ohio

first cutting of hay in the second year.

Each 32-acre field is divided the narrow way into four equal-sized lots during the season they're to be used as hog pasture. Pigs are farrowed in 20 boxes grouped at a central location. After one or two weeks in the boxes, sows and pigs are moved into one of the eight-acre lots.

Since 25 sows will seldom farrow within the same week, 20 boxes are enough. Each group of 25 sows and pigs go into one of the eight-acre lots.

The next group will go in the second lot. Thus the four lots provide fresh ground for the pigs of that year. A permanent plastic pipe has been buried 30 inches deep the length of each lane. There are four self-draining all-weather hydrants on each line.

The plastic pipe replaces metal pipe used formerly above ground. However, metal pipe is still used to take the water from the hydrant to the center of each lot. Here it's brought up through a six-foot square wooden platform and capped with a livestock fountain.

During the slack work season ahead of pasturing, each lot is equipped with sunshades. These are built to the size needed by driving sets of steel fence posts for corners and supports. Cross-pieces are fastened to these and old hay, straw or bedding tossed on top for shade.

Each lot also has self-feeders at the rate of one opening per five pigs. Pig creeps are used until the sows are removed when the pigs are eight weeks old. Unfloored range boxes built on runners and open at the front are provided for each lot. These are 12 x 14 feet, four feet high at the front. with an eight-inch drop in the roof.

Pigs are pushed along on a balanced ration using as much home-grown grain as possible. The protein ration runs about nine-to-one except when the pigs are on real good clover and then it's weakened down a little. He feeds the same ration to sows while they're with the pigs.

After sows are separated they get ear corn, pasture and some supplement. Bred sows are fed alfalfa meal, oats, supplement and corn, varying the amounts according to closeness to farrowing.

February and May pigs never go in the barn—they're fattened right in that eight-acre lot where they start. August and November pigs are finished on a feeding floor. The hogs are topped out and sold under meat-type grading at the Wilmington Producers yards.

A pioneer in live grading hogs for meat type, Snyder's porkers were running as high as 60 to 65 per cent in the meat type No. 1.

Then he changed boars and it dropped down to 35 to 40 per cent. But he's back on the beam now with 22 out of his last load of 30 hitting the top meat-hog grade.

Several systems of breeding have been tried by Snyder. He thinks the best idea yet is rotational crossbreeding, using purebred boars. Here's how it works.

He starts out with good gilts, has liked both Hampshires and Durocs for this purpose. They're bred to a purebred boar of a different breed.

Litters of seven or more pigs are earnotched. If it's time to save new gilts, they're picked from the best of the ear-notched pigs. Either two or four litters are produced by each sow before she goes to market, with the same boar matings made as long as those sows are kept.

When new gilts are saved they're bred to a boar of a second breed. Next time gilts are saved a boar of another breed is used as he starts through the cycle again.

In the future, Snyder plans to use only sires from litters certified "Ohio superior" in the swine testing station work. He thinks this is the greatest boon to hit the hog industry in recent years.

So Much For So Little . . . That's Legume Inoculants

The cost is small but the returns, in terms of increased yields and better quality legume crops, are great. Yet, says L. C. Coffey, Texas agronomist, farmers still plant legumes without spending the few cents an acre required to do the inoculating job.

He says 50 cents will buy the inoculant needed to take care of enough alfalfa or clover seed to plant up to five acres. Less than 25 cents an acre will inoculate winter peas or vetch. Coffey points out that different strains of bacteria are effective on different classes of legumes. Be sure and get the culture recommended for the crop to be planted.

The seed inoculants contain beneficial live bacteria. The bacteria attach themselves to the roots of leguminous plants where they absorb energy from the plant and in turn help the plant to take nitrogen from the air. They do this by a process known as "nitrogen fixing."

Both effective and ineffective bacteria may occur naturally in the soil but Coffey says why take a chance on lower yields and quality by not inoculating the seed.

Texas A. & M.

How We Got Rid of Mastitis

A Step-by-step Mastitis Control Program to save $25 a month . . .

Condensed from
Wisconsin Special Circular 40

(1) Complete Herd Examination

We had the whole herd examined by Dr. Jones, our veterinarian. He examined the udder of every cow and took milk samples from each quarter. Our veterinarian has a laboratory at his office where he tested the samples, but he says some other veterinarians send or take samples to the State Disease Control Laboratory for examination. By examining the udders and testing milk samples, Dr. Jones located most of the infected cows. Without the lab test, we would have missed many "carrier" cows —those that have mastitis germs in their udders but only occasionally give "gargety" milk. Leave those cows in the herd and in a few weeks you're right back where you started.

(2) Supervised Treatment

The first thing Doc told us was "put all of the infected cows together at one end of the barn and milk them last." He suggested that we sell one cow with a very serious infection. Then we asked him to treat the infected cows. We figured he would know the right drugs for the kind of infection in our herd.

The obvious marks of mastitis infection—clotted milk and swollen hard areas in the udder—soon disappeared. But we weren't satisfied until Dr. Jones took milk samples from each quarter again. This second lab test showed that the treatment was successful. Doc's drugs had cleared up the infected quarters, and our care had kept mastitis from spreading to the other cows. Through Doc's help we had a mastitis-free herd.

(3) Raise Own Replacements

We raise our own replacements —we don't want to buy someone else's trouble. If we ever want to expand our herd, we will buy yearling heifers.

(4) Milk Infected Cows Last

If a cow shows clotted milk, we milk her last. This way we control the spread of infection.

(5) Wash With Disinfectant

Before milking, we wash udders with a disinfectant solution. We like chlorine but according to Doc, other solutions work just as

Reprinted from Wisconsin Special Circular 40,
College of Agriculture, Madison, Wisconsin

well. Jack, my son, mixes the solution while I'm setting up the machines. Directions are right on the bottle. We use a disposable towel to do the wiping. This way we avoid any chance of spreading infection. Towels cost only a few cents a week.

> Chinese proverb: The man who removes a mountain begins by carrying away small stones.

(6) Disinfect Between Cows

Teat cups can spread an infection from one cow to another, so we dip the teat cups in disinfectant solution between cows. That means that we have two pails of disinfectant that we move along on a cart we built for this purpose as we milk — one for washing udders and one for rinsing teat cups.

(7) Avoid Udder Damage

We take the milking machine off a cow as soon as the milk stops flowing. In fact, we time our milking pretty carefully—try to train our cows to milk out clean in 3 to 4 minutes. We strip each one clean but take off the cups before they creep up and damage the udder.

(8) Build Larger Stalls

We lengthened and widened our stalls on Doc's advice. This cost us some money but was paid off in less injuries to teats and udders—which means less chance for mastitis germs to get started. And we keep the barnyard free of wire, sticks and stones.

MORE CATTLE, HOGS SEEN FOR 1956

The large production of feed, grains, and forage this year will undoubtedly result in increased numbers of cattle and hogs in 1956, according to A. W. Willis, Wyoming extension economist.

He says, "It looks like we'll have a record high of 109 million tons of hay this year in the U. S. This will be 5 per cent above last year. In addition, pastures and ranges are much improved over last year.

"Also, corn production is now estimated at 3.5 billion bushels compared to 3 billion in 1954. Soybean is up at least 6 per cent and production may show a further percentage increase because of high yields.

Sorghum acreage is 15 per cent above last year and at present, yields look to be average or better. Barley production is forecast at 304 million bushels, 4 per cent above last year; and the oat crop is estimated at 1.5 billion bushels, which is slightly above last year."

University of Wyoming

Mysterious Molybdenum

Bio-chemists dig into the secrets of soil trace elements and report some interesting findings . . .

Condensed from Pennsylvania Farmer

AMONG the trace elements molybdenum presents a very interesting special case. Some plants require a considerable amount, relatively speaking, others very little but that little is important. Under some conditions a half pound per acre will produce results which would require a ton of lime.

During June of this year a three-day symposium on trace elements was held at John Hopkins University. Over a hundred outstanding scientists were present. They came from the United States, Canada, Australia, Japan and England.

The general subject under discussion was inorganic nitrogen metabolism. That deals with how nitrogen changes from one form to another in the soil and how plants make use of it. That leads to molybdenum which apparently has a lot to do with the way plants get nitrogen from the soil.

Molybdenum is necessary for the fixation of atmospheric nitrogen by the bacteria in the root nodules of legumes. It is also necessary for all plants in the reduction of nitrates, and plants take their nitrogen in the nitrate form and build it into protein in the leaves.

In 1939 two University of California research men showed by laboratory tests that molybdenum is essential for plant growth. At that time is was thought unlikely that this would have much effect on crop production since the molybdenum requirements of plants are low and the soils investigated then seemed to have plenty. Further research, however, leads the scientists to believe that molybdenum deficiencies in soils may be more general than realized.

In 1941-42 Dr. Alfred J. Anderson of Australia obtained field responses to molybdenum. As a result of his discoveries a revolution in the agricultural economy of his country has taken place. Clover yields have increased from nothing to as much as three or four tons per acre

Reprinted by permission from Pennsylvania Farmer, Pittsburgh, Pennsylvania

after application of a few ounces of a molybdenum chemical. Ranchers who have adopted his recommendations have changed thousands of acres of poor soils into improved clover-grass pastures. Even where no increase in yield occurs, Dr. Anderson reported that the molybdenum treated crops often have a higher protein content as a result of their improved ability to fix nitrogen from the air. The effect can be seen in their color.

Last year about five per cent of the superphosphate used in the state of New South Wales contained molybdenum at the rate of one and a half pounds of molybdic oxide per ton of superphosphate. This year more than 10 per cent will be so treated.

There can be too much as well as too little molybdenum for the good of the grazing animal, according to Dr. A. T. Dick of Australia. Too much will result in a copper deficiency; too little will result in a copper excess. In both cases sheep grazing on the pastures die by the dozen. Apparently a balance between copper and molybdenum is needed. The range is fairly wide and can be met by fertilizer companies who are informed of the needs of the land. It seems that when the balance between copper and molybdenum in the soil gets out of line too much trouble follows. Dr. Dick reported that hundreds of sheep have died in Australia from copper poisoning when there was not too much copper but too little m o l y b d e n u m in the soil, which made the relationship between the two elements out of balance.

A million acres will get the molybdenum treatment in New Zealand and Australia this year. In the U. S. developments have not reached such proportions. The scientists meeting in Baltimore seemed to think that this is because molybdenum-deficient soils have been studied less in this country, and that more deficiencies may show up later as further investigations are made.

On the basis of what is now known, the Baltimore convention indicated that where soils are deficient application of a molybdenum chemical (ammonium molybdate or molybdic oxide) can be made in a number of ways. It can be mixed in the fertilizer and applied as a top-dressing. It can be sprayed or dusted with an inert carrier. Or the seeds may be soaked or dusted before sowing.

For pastures recommended application rates are two and a half ounces of molybdate per acre every four to six years. For horticultural crops about e i g h t ounces per acre annually is suggested; for field crops, about two ounces per acre annually. The

cost of the material would run from 15c to 50c per acre, and the application cost perhaps around a dollar. Obviously it is not a very expensive proposition. This fact should not tempt farmers to use too much, which we understand is as bad as not enough.

> The average U.S. farmer now spends about $3,000 a year for such production supplies as feed, seed, fertilizer, petroleum products, farm machinery, building materials, and hardware.

"Recommended rates should not be exceeded," say research men, "particularly on forage crops, since too much may cause copper deficiency in cattle and sheep. Generally there is not enough moly in the soil to cause such trouble, but on peat soils and on some poorly drained alkaline soils where molybdenum has accumulated disease may occur. It is easily corrected, however, by feeding small quantities of copper salts in licks or drinking water. Conversely where animals are affected with copper toxicity addition of moly redresses the balance."

Usually there is enough molybdenum in the soil, but sometimes it is present in a form that is not available to the crop. Such unavailability is generally caused by soil acidity. Liming, which makes soil more alkaline, releases molybdenum to plants. On some soils this release of moly counteracting the acidity of the soil may be the chief function of liming. In such cases adding a few ounces of molybdenum may be more effective than several tons of limestone.

Among acid soils in which molybdenum is quite likely to be unavailable are soils high in iron oxide, soils high in available manganese, soils recently brought under cultivation from pasture or waste, and soils heavily dressed with sulphates.

> Voltaire said that in 100 years the Bible would be a forgotten book, found only in the museums. When the 100 years were up, Voltaire's home was occupied by the Geneva Bible Society.

Soils likely to be totally deficient in molybdenum are those that have been highly leached, such as coastal sands and hill country soils, soils that have been heavily cropped, and alkaline soils in areas of heavy rainfall.

Soils not likely to be deficient in molybdenum are highly productive f e r t i l e soils, heavily limed or manured soils, alkaline soils in regions of low rainfall and peat and muck soils.

One Bull Can Produce 100,000 Calves A Year

A late and comprehensive report on the use of frozen semen . . .

Condensed from The Farm Quarterly

Grant Cannon

SINCE his death in November, 1953, Pabst Burke Tritomia Don has sired several hundred healthy, normal calves. He will be the father of a good many more before the last of his semen, which was frozen before his death and banked for future use, is gone. This Holstein bull, classified Excellent and given the rating of Gold Medal Sire on the basis of his daughters' performance, was one of the first to show the enormous value of frozen semen in carrying on the breeding work of a fine sire after his death. When they saw their bull failing, the Central Ohio Breeders Association, who owned him, banked around a thousand ampules of frozen semen for the future; when this is all used, he will have sired about twice as many calves since his death as most bulls get in a lifetime of natural service.

Three years ago when news of the first successful experiments in maintaining life in the semen after freezing came from Cambridge, England, it was predicted that such posthumous breeding might be possible some time in the future. The future is here, sooner than we thought.

This is the most spectacular development since artificial insemination was started. By freezing semen, the full potential of artificial insemination can now be offered to the farmer. A decade ago, artificial insemination made it possible for farmers to breed their cows to far better bulls than they could afford when they had to buy their own bull. But, the choice of which of these good bulls to use was left to chance. With the development of frozen semen, the farmer can breed to any bull in the stud for a fee of $5 to $10. He can plan a breeding program of inbreeding, line breeding, or outcrossing far in advance and be sure that the semen will be available. All

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22 East 12th Street, Cincinnati 10, Ohio

that is required is that he let the inseminator technician know the bull he wants to use. As a matter of fact, it is now possible for any dairyman on any county road in the United States to breed his cow to any bull in the world. He may have a lot of arranging to do and his fee may run into the hundreds of dollars, but it is possible. Since it has become possible to plan breeding programs, a lot of good farmers have been reading Lush, Winters, and Gilmore, brushing up on their genetics and breeding systems.

A group of English scientists were the ones who finally discovered the technique of freezing bull semen without destroying its fertility. These scientists found that by diluting the semen with a 10 per cent solution of glycerol, the material could be safely frozen. It is still not finally determined whether the glycerol partially dehydrates the sperm and so prevents the formation of ice crystals which would puncture the cell walls or whether it changes the nature of the crystals which are formed and protects the cell in this way.

What is known is that semen which has been allowed to remain in a glycerol solution for 4 to 18 hours can be frozen and later thawed and used to inseminate cows. This is what the English scientists reported to the 1952 International Congress of Artificial Insemination in Copenhagen, Denmark. After the Congress, many of the men who attended took a side trip to Cambridge to see for themselves. One of these, Max Drake, the manager of the Northern Ohio Breeders Association, said, "When they thawed that little chunk of ice and I was able to see with my own eyes millions of living sperm thrashing around under the microscope, I was stunned. I knew that this was the beginning of a revolution in the whole field of artificial insemination."

The speed with which most of the bull studs in the country are being changed from a liquid, fresh semen operation to frozen semen has surprised even such men as Drake, who started planning the change-over the day he visited Cambridge. His own organization has been going through the pilot and testing stages and are changing from liquid semen to frozen as fast as they can train and equip technicians. Even so, they won't be the first to convert completely; Central Ohio Breeders Association was to be completely in frozen semen by early fall.

How to Freeze Semen

As far as the bull is concerned there is no difference between the two processes. Semen collections are made the same way, using a cow that is perpetually in heat to excite the bull and collect-

ing the semen in an artificial vagina. The change in processing begins at this point. The semen which is delivered to the laboratory is examined under the microscope to check the motility of the sperm and is then tested in a photoelectric device which measures the turbidity and translates this reading into the number of sperm. With these facts the laboratory technician can determine the rate at which the semen can be diluted and still deliver 10 million living sperm in each milliliter of thawed semen, the amount needed to service a cow.

The average cow gives 5,500 pounds of milk. But the record for milk production is 42,805 pounds—nearly eight times the national average.

The semen is processed for freezing as follows: First, a diluent made of egg yolk and sodium citrate is divided into two equal parts. To half of this is added an antibiotic to kill disease germs. Glycerol is added to the second half. Then the half of the mixture is slowly cooled to 40 degrees, which usually takes from two to six hours. Then the second half of the diluent (containing glycerol) is added, a small amount at a time, over a period of several hours. This mixture is then allowed to stand for at least thirty minutes before freezing. During this period of glycerization, a change takes place in the sperm making it possible to freeze it without destroying its life. At the end of this time the diluted semen is poured into the glass ampules or plastic vials in which it is to be frozen. Each vial or ampule will hold one milliliter of diluted semen; one service of the bull, after dilution, fills from 400 to 1,000 ampules.

Adding the glycerol solution is the first critical operation in the freezing process. There are two critical periods in the actual freezing which come when water forms ice crystals and when the chemical salts form ice crystals. The solution to the crystallization problem is to drop the temperature past these danger points at great speed. The semen is cooled from 25 degrees to around 5 degrees below zero at the rate of four degrees a minute. At this point, powdered dry-ice is packed around the vials of semen in their alcohol bath. This smoking, bubbling sludge drops the temperature 8 to 10 degrees a minute until it reaches 110 degrees below zero. The fast freezing causes the liquids to vitrify rather than crystallize.

At 110 degrees below zero, which is so cold that an ampule

of semen will burn the skin if it is held for long, the frozen semen is stored indefinitely. During the freezing and the first week of storage, there is a drop of 10 per cent of live sperm in the ampule; after that, the frozen semen seems to stabilize and there is no further kill of sperm.

The freezing of semen in this fashion works very well with most bulls. There are, however, occasional bulls who produce sperm which won't stand freezing. As yet, scientists do not know why this is, or what may be done to correct it. All that is known is that these bulls can only be used with the fresh semen method of artificial insemination.

Using Frozen Semen

The semen must be kept at 110 degrees below zero or colder at all times—right up to the moment of thawing and inseminating. This means that the inseminator technicians must have refrigeration equipment that makes the normal farm deep-freezer seem cozy and warm. Some associations are solving this by setting up large dry-ice refrigerators at central points where several technicians can use them as storage banks and go to them daily to fill their dry-ice packed carrying-boxes. Other organizations have smaller boxes, big enough to hold a two-week supply, for each technician. Also on the market are electric refrigerators capable of holding the stored semen at temperatures down to 150 below zero. Equipment of this sort is filling a pressing need both for large central storage units and for smaller, area banks.

One of the newest carrying-boxes for technicians was invented by Max Drake and his associates at Northern Ohio Breeders Association. This small, white box is capable of holding enough tubes of frozen semen (40) for a full day's work. The box is made by placing beads of polysterne plastic in a mold and exploding them with live steam. The enormously expanding beads fill in the mold, forming a seamless plastic box. A molded lid is made the same way. The box has such marvelous insulating qualities that when one is filled with dry-ice and alcohol and placed beside an empty box, it is impossible to tell by feeling the inch-and-a-half thick walls of the boxes which of the two has an inside temperature of 110 degrees below zero. These inexpensive boxes hold this temperature for a cost of 10 cents a day for dry-ice.

The technician begins his day by filling his cold box with enough semen to last him the day. From the calls he has scheduled he knows the breed of the bulls that will be wanted; and, since the farmers have learned that

they can select any bull in the stud, he may have calls for semen from specific bulls.

Some technicians thaw the ampule of semen by dropping it into a glass of cool water; it takes about two minutes for the semen to become liquid and usable. Other technicians thaw the semen by holding the ampule in their hands—tossing it from hand to hand until it is warm enough to hold without danger of burning. This system takes about three to four minutes to liquify the semen. One technician even thaws the ampule in his mouth after it has passed the burning cold stage. After a careful comparison of different thawing methods, one artificial breeding organization found that their highest conception rates came from those technicians who were thawing the ampules in ice water. It took longer, five minutes, but it was so much better that all their technicians are now using this system.

> The most valuable resource of this nation is the soil. Gold is more spectacular; iron has, in two generations, made men richer; copper has opened up greater possibilities of advancing techniques. But it is the soil which produces the lasting and essential wealth of the nation.

Insemination is performed much the same as with the ordinary liquid semen. Both glass and plastic containers are in use. With the new plastic containers, the end is nipped off and the inseminating tube fitted into the neck of the vial; the container becomes the bulb to squeeze the semen through the tube. With the glass ampules, the end is filed off and the inseminating tube dipped in and the semen drawn up by the vacuum created by a removable bulb at the other end.

In order to guide the inseminating tube directly into the uterus, the technician inserts his hand and arm, gloved to the shoulder, into the rectum, and, through the pliable rectum walls, he is able to feel the inseminating tube which he has inserted into the vagina with his right hand and thread it into the entrance to the uterus. With the inseminating tube in the mouth of the uterus, the bulb is squeezed and 10 million living sperm are squirted in. From there, through their own motion and through muscular contractions of the uterus, one of them reaches and fertilizes the egg. One only of the 10 million need reach and penetrate the egg.

Does one of them always reach the egg? Not always with frozen semen or liquid semen or by

natural service. However, split ejaculation tests, in which one half of the semen is frozen, the other half used as fresh semen, show that the frozen semen has as high a rate of conception as does the liquid semen and, contrary to popular belief, artificial insemination has a rate of conception which is quite comparable to natural service.

> It is more blessed to be deceived in some things than to be suspicious in all things.

Proving New Sires

This ability to dilute the sperm and still get good conception rates is reducing the number of bulls we need and, at the same time, making the quality of each bull much more important. In 1935, we felt a bull did all right if he produced 40 calves in a year. In 1945, with artificial insemination, he could sire 1,500. In 1955, on a full scale frozen semen program, a bull can produce anywhere from 15,000 to 100,000 each year. In other words, under artificial insemination a good bull had 38 times the effect in improving the herd as did a good bull used naturally; and with frozen semen he has 2,500 times the effect. The artificial insemination people like to speak of this, but the thing that keeps them awake at night is that they know that a poor bull can do proportionately as much damage.

For agriculture in general, the frozen semen technique means that better bulls can have an even greater influence on our dairy cattle than they have under artificial insemination with fresh semen. It also means that we must find even better bulls to use and better methods of handling the frozen semen. And while the bull stud management and the technicians are doing this work, the scientists are hard on the trail of even more spectacular ways to store semen. What does the future hold? Several scientists are attempting to find ways to dehydrate the sperm without killing it so that semen could be held as a dry powder without refrigeration.

> A man's intellect is judged by his ability to disagree without being disagreeable.

Another interesting probability of frozen semen is its effect on foreign livestock importations. Our import laws on livestock are involved and cumbersome, preventing the easy movement of breeding stock between this country and foreign countries. These laws will likely be revised to permit the easy exchange of semen.

How Can Income from Beef Cows be Increased?

Let's take a look at programs of farmers who feed out calves dropped on the farm . . .

Condensed from Missouri Ruralist
Cordell Tindall

BEEF cows fit nicely on thousands of farms. They utilize grass and roughage that can be grown on land unsuited to other crops. They require relatively little labor.

The only hitch is that income from beef cows in Missouri is only $16 a head a year, when cost of grass and roughage feed is considered. That figure looks pretty small but farm management experts say it is a fair one. Despite this, beef cows are the chief source of income of literally thousands of farms in Missouri and other states.

How can income from beef cows be increased? There are two obvious answers: feed out calves produced on the farm, or make calves produced worth more money.

One idea that looks pretty good at present is to creep-feed calves, produce baby beeves.

Farm management and livestock specialists are now encouraging this idea. This year for the first time the annual beef production contest, co-sponsored by the Missouri Agricultural Extension Service and the Chambers of Commerce of Kansas City and St. Louis, includes a class for creep-fed calves. Over the state you hear more talk about creep-feeding—more calf creeps can be noted on farms.

It's not that creep-feeding actually has been discouraged in the past, points out E. S. Matteson, Extension livestock specialist, but feeder calves were selling so high in comparison to prices of fed cattle that it looked like good business to let somebody else feed them.

The dry weather of recent summers also has encouraged creep-feeding. When pastures are short the milk supply of cows naturally falls short, too. The co-operative feeder calf sales have shown the value of selling top-quality calves.

Purebred producers also find

Reprinted by permission from Missouri Ruralist, Kansas City, Missouri

that creep-feeding is a profitable practice.

There is nothing new about creep-feeding. A lot of beef producers have been doing it for years. One good beef man who has made it pay year after year is W. H. Gardner, of Boone county. Let's take a look at his program.

A cow herd made up of matrons that are both big and of top quality is one that makes his creep-feeding pay. Cows are Herefords, he has about 40 of them.

Next, he has early calves—and this looks like an essential part of any successful creep-feeding program. Mr. Gardner turns in his bull about March 12, leaves him with cows only 3 months.

When calves are big enough to eat grain, they get it. Creep-feeding is done in a shed. Several years ago Mr. Gardner bought a "back 80" that adjoins his original farm. Mostly rough land, this farm serves as pasture for the cow herd in summer. Here's where the creep shed is located. Mr. Gardner likes the shed better than a feeder, is of the opinion there is less waste of feed from rain spoilage.

A feed room is located in one end of the shed. The shed is open to the south, boxed in on other 3 sides.

Corn and oats, equal parts, are fed to calves and a sack of supplement is mixed with every 14 bushels of grain.

Last year Mr. Gardner fed his calves 15 or 16 bushels of corn after they were weaned, sold them weighing 780 pounds as baby beeves for about 25 cents a pound.

Some indication of kind of calves produced by this method can be noted from his replacement heifers—which really are top quality.

What kind of results normally can be expected from creep-feeding calves? This year a test was conducted at Missouri Agricultural Experiment Station checking creep-fed Shorthorn calves against calves that were not creep-fed.

On August 23, these 2 groups of calves were weighed. Creep-fed calves with 154 days of feeding weighed 57 pounds more than calves not creep-fed, according to James Comfort, who was in charge of tests.

Professor Comfort points out that actually the calves had not been eating very long at that time. A more typical gain that can be expected is about 100 pounds more. In earlier tests at the old Sni-a-Bar experimental farm, a 3-year average figure showed increases of about 100 pounds a calf for creep-fed calves.

The creep-feed used in tests this summer was 8 parts shelled corn to 1 part cottonseed cake.

Professor Comfort observes that of 2 types of creeps used, the tall feeder had less waste feed. Calves are not able to move about as freely. A shed-type creep also was used.

A program of producing baby beeves with creep-feeding followed by grain feeding offers a lot of possibilities, Professor Comfort believes. He notes increased weights do not tell the entire story—there's even more difference in condition of calves.

Best bet is to make calves into more than just grass-fat animals—they need some grain.

More and more feeders like feeder calves that are accustomed to eating grain, too. In tests at the University of Missouri, calves that have not been creep-fed will get grain just before weaning. Perhaps this is an idea you can use.

To make the baby beef program work, Professor Comfort lists several essentials:

Good milking cows that will get calves off to a vigorous start.

Early maturing kind of calves —the kind that will have some finish at light weights.

Early castrating and dehorning.

Early calves — January and February to be preferred.

In fact, early calves (just as far from July 4 either way as possible) get the nod from just about all experts in any program of increasing the value of beef calves.

HIGH PRODUCTION BY "ARTIFICIALS"

A recent summary of the production records of 876 daughters of 89 sires used for artificial insemination in West Virginia since January 1, 1946, shows results of particular interest to dairy farmers, Gerry Heebink, Extension dairyman, points out.

The average production of these 876 artificially-sired daughters which have Dairy Herd Improvement Association records was 8,325 pounds of milk of 4.3 per cent test, and 355 pounds of fat. These averages are based on 1,486 records, or an average of 1.7 records per daughter and 10 daughters per sire.

"Inheritance determines the maximum level at which cows CAN produce milk," Heebink explained. "The amount they DO produce is determined, however, by the quality of the feed and care they receive."

Management is the operating force. It offers an opportunity for the expression of the inheritance that exists in the dairy herd.

HE REBUILT CIRCLE G RANCH

The story of an industrialist's success as a result of his soil conservation program .

Condensed from Soil Conservation

J. H. Cheek, Soil Conservation Service

E. B. GERMANY changed an unsightly, non-productive landscape of hills and hollows covered with tickle grass, poorjo, and scrub oaks into a productive, picturesque panorama of soil building grasses and legumes.

Germany is president of the Lone Star Steel Company and a well known rancher of Van Zandt County, Tex. He accomplished his feat in the last 8 years on his 325-acre Circle G Ranch 3 miles south of Grand Saline.

In 1946 when Germany acquired the ranch it was carrying 15 head of scrubby livestock that looked to be as underfed as the land was overgrazed. Today 110 head of sleek Angus and Brangus cattle graze 300 acres of crimson and hop clovers, vetch, sericea lespedeza, dallis and bermudagrass. Some 60 tons of hay are cut and put in the barns each spring.

When Germany purchased his place the neighbors thought it was the poorest piece in Van Zandt. But Germany explained: "I did not buy this ranch to build a display of fine houses, barns and fences, but to rebuild its wornout soils. I believe I can do that in a reasonable length of time and make a fair return on my money doing it."

At once he became a cooperator with the Neches-Sabine Soil Conservation District and through it, sought the assistance of the Soil Conservation Service in soil, water, and plant conservation.

The technicians first made a soil survey of the entire ranch. The information thus obtained was the basis for the recommendations put into the ranch plan. Davis, the manager, translated the plan into a living, growing thing. He said: "I like it because it is all written down on the aerial photograph, field by field. It is workable, concise, and easily understood."

The plan that Davis liked so well called for clearing 200 acres of timber and seeding it and another 100 acres to adapted grasses and legumes. The other

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25 acres were reserved for farmstead, lakes, and spots of woodland for livestock and wildlife shelter. Cross fences were recommended for controlled grazing. Ponds were located at vantage points for stock water. Recommendations were made for stocking the ponds with fish and planting shrubs for quail food and cover. The original plan was revised to include an irrigation system as insurance against droughts, and to provide for hives of bees to be placed in the fields of vetch and clover for pollination and to furnish honey for the table. Manager Davis has followed these recommendations meticulously.

Among the unique things that attract your attention at Circle G is a fence grown from thorny multiflora rose that defies passage of everything but rabbits and they have to be awfully careful to get through!

Then there are several coops of quail—51 pairs in all—that raise about 600 birds each year. Some are turned loose to feed and hide in the multiflora rose and other wildlife habitats. The rest are not so lucky—they go to the deep freeze!

Under normal conditions a 10-acre lake that lies adjacent to the farmstead furnishes enough fish for the Germany's table.

Molasses Prove Good Dairy Feed

Dairymen can supplement roughages of low feed value this winter with molasses, reports G. A. Williams, extension dairyman at Purdue University.

Feeding tests indicate that 6.5 gallons of molasses are equivalent in livestock feed value to one bushel of corn. If the corn-molasses price ration is favorable, dairymen should consider the use of molasses, Williams says.

Molasses may be diluted and poured over unpalatable forages, thus increasing consumption, or may be fed free choice up to two or even three pounds per cow daily if prices are favorable. Three pounds of molasses equals about one quart.

Molasses does not increase the feeding value of low grade forages but it does add palatability and permits the cow to consume digestible nutrients in larger amounts.

Purdue University

Insurance on Farm Earnings

A new type of insurance protects against loss of income after fire or other loss . . .

Condensed from The Rural New Yorker

NEW YORK State farmers can now obtain insurance to safeguard their earnings after a fire or other insurable loss.

The new policy, which promises to fill an important gap in any farm insurance program, replaces normal farm earnings while physical property is being restored after a loss. A recent survey shows that a period ranging from six weeks to over a year is required before full farm operations are resumed after a fire. During this non-operating period, there are many continuing obligations, including payments on loans, taxes, cost of labor to shelter and feed livestock, and owner's income required to provide shelter, food and clothing for himself and family.

Lacking adequate reserves, the survey further reveals that many farmers are forced to eat into their property insurance fund to meet these continuing expenses. Thus, even when physical property is fully covered by insurance, most farmers find it impossible to direct 100 per cent of their property insurance settlement into new facilities. Depending on the nature of a loss, and the extent of continuing expenses, this situation could well impair, if not permanently cripple, an entire farm operation.

Like any other business, a farm is conducted for the income it provides. If the property is destroyed, the income is destroyed. If there is anything more important than tangible assets—that is, buildings, equipment or livestock —it is a continuing and profitable income. Banks are even more interested in the earnings capacity of a farm than in collateral. Banks are in business to take interest, not to take title. Despite this, farmers and other businessmen alike still think in terms of protecting tangibles, rather than potentials. The idea of insurance against lost earnings due to a fire or other disaster is not new, but covering policies to date largely have been limited to in-

Reprinted by permission from The Rural New Yorker, New York City

dustrial and certain mercantile operations.

To provide a clear picture of what is involved, underwriters recommend this method to estimate possible lost earnings: Assume it will take four months to re-locate or rebuild. Apply this time to peak earnings period. Estimate the total income for this period, then subtract farm operating costs which will not continue after a loss. The result is a fair estimate of lost earnings. If cash savings, bonds or other reserves do not cover this amount, then a farm earnings policy may well be in order.

While fire and lightning are the largest threats to interruption of farm operations, countless other perils should be considered. Windstorms in particular can cause extensive damage. Hurricane Hazel, along with scores of lesser storms, accounted for more than $1,000,000 property loss to New York State farms last year. Loss of earnings resulting from these storms probably totaled several times this amount. Farm earnings insurance can be extended at small additional cost to include this and other wind damage, explosion, or other hazards.

The new policy form is short, complete and tailored to the specific needs of the individual farm. The premium cost is about one and a half times the fire insurance rate for farm buildings. The expense can, of course, be deducted as a business expense for tax purposes. Most important, it protects farm earnings against its worst peril—interruption.

CATTLE TESTED FOR ONION-FLAVORED MEAT

It's all right to run beef cattle on onion-flavored pasture if they are removed from such pasture at least 4 days before slaughtering. When that is done the beef will have no onion flavors or odors.

This fact was established in a test at a Kentucky Agricultural Experiment Station. Twelve grade Hereford steers averaging 715 pounds were placed on a mixed grass pasture heavily infested with wild onions. Animals were removed and slaughtered from time to time and their meat tested by a panel of tasters.

Beef from steers slaughtered the day they were taken off the onion pasture showed marked flavor and odors, after 2 days, slight onion flavors and odors, and after 4 days, no onion flavor or odor could be detected.

THE THEORY OF THE FOUR MONTHS-OLD HEIFER

In an unusual article, the author develops his theory that nature provides in the 4 months-old heifer calf a preview of the cow to come . . .

Condensed from Holstein-Friesian World

Roland Ramsay

IT HAS never been a matter of 'common knowledge' but it is true nonetheless that among keenly observing breeders and herdsmen of long experience there is the belief that Nature gives us all a surprisingly accurate preview of the mature animal in the calf at about 4 months of age.

In other words—if a heifer at about 4 months of age is 'off' in the rump or legs, lacks body capacity, is weak back of the shoulders and heart or is undesirable in respect to 'head, neck and shoulders' she is quite likely to end up as a mature animal with these same faults and in about the same degree. If, on the other hand, she is 'right' at that age she is almost sure to mature 'fundamentally right.' The thing Nature does not tell us, as far as I have been able to discover, is the age the animal is destined to mature.

Three Hypothetical Cases

As an example of how Nature is likely to work let us take three 'outstandingly' desirable 4 months old heifers—each equally desirable in 'feet and legs', rump, body capacity and 'heads, necks and shoulders' with each, as viewed from the rear, having a high, wide arch between the hind legs indicating that each has a 'place' for a highly attached wide udder. For the sake of comparison we will say that one calf is destined to become an 'outstanding Calf' and Yearling, another a great 2 and 3 year-old and the third a great show cow at the normal maturing age of about 8 years.

So to begin with we have these three equally outstanding 4 months old heifers. We know from the 'theory of the 4 month old heifer' that each is likely to

Reprinted by permission from the Holstein-Friesian World, Laconia, New York

mature with about the same 'balance' of conformation but we do not know which will mature when so we give these heifers a good growing ration and observe them carefully. In a relatively short time we begin to notice that two of the heifers are beginning to show definite signs of 'adolescence' and this process continues until at about 12 months of age we find that the calf that failed to show any definite signs of adolescence has grown into a 'top-flight' show calf with a conformation closely resembling the 'true type' model.

The other two heifers still have their good 'feet and legs' and their great 'heads, necks and shoulders' but they have been doing a lot of rapid growing and have become quite 'leggy'. They have made quite a lot of growth in 'length of body' at the expense of 'depth of body' and according to our present standards of Judging we know that they are too 'strong in the back and loins' (which causes them to appear too 'low in the pins') and lack too much 'depth' to show as calves.

As Senior Yearlings we find that as is the case with quite a few of our outstanding calves our great Show Calf is again rated a top-flight individual. She is beginning to show a little 'easyness' in the back and a slight tendency toward a 'tilting' rump but not enough to keep her out of the top spot. The heifer destined to become the great 2 and 3 year-old has now bodied down and 'leveled' up quite a 'promising' 2-yr.-old prospect but the third heifer still has all the 'faults' she had at 12 months only 'more-so'. About the only 'good' you can say about her is that she still has her great 'head, neck and shoulders' and she still has her good 'legs' and 'a place for an udder'.

All American Examples

From this point on the history of over a quarter of a Century of 'All-American' designations should give us a reliable picture as to the 'outcome' of our 3 heifers in milking form.

All-American history shows us that an All-American Calf quite often comes back the following year and is again made All-American as a Sr.-Yearling, but, it also shows us that she practically never comes back as a 2-yr.-old and wins. All-American history shows us that an All-American 2-yr.-old sometimes makes it again as a 3-yr.-old, but, is seldom heard of in big shows two years later. All-American 4-year-olds have been known to break into the 'top spot' as an Aged Cow but history shows us that the average All-American Aged Cow never had a show halter on un-

til she was 4 years old.

In Milking Classes

From this 'thumb-nail' sketch of the history of All-Americans we must concede that, as first calf heifers, our outstanding show calf and yearling has already dropped out of the picture just leaving us the great 2-yr.-old and the normal maturing 2-yr.-old destined to develop into the great aged cow, who, at this point is likely to be a 'big, leggy, long-bodied' heifer with a good set of legs, great head, neck and shoulders, beautiful udder but 'strong in the back and low in the pins' and lacking depth of body. Classifications of the two 2-yr.-olds would doubtless show the one with the highest score permitted and the other with just a high Good rating.

Coming back to these two heifers as 4-yr.-olds we find that the V.G. 2-yr.-old had won top honors again as a 3-yr.-old and had been raised to E and the other heifer had been raised to a high GP but now, as 3rd calf heifers, we can expect to find the E cow showing quite 'easy' in the back and the rump showing definite signs of 'tilting' all of which causes her udder to go down, particularly in the fore quarters, and if Classified at this stage would go no higher than V.G. The other heifer by now has 'bodied down and leveled up' to the extent where she was easily raised to V.G. and probably made her first appearance in the show ring as a 4-yr.-old.

Four Years Later

Looking in on the scene 4 years later we would most likely find that the "E" cow was either gone or 'out of the picture' and the one remaining cow, now fully matured, was a big, strong, straight-topped, level rumped cow with a beautiful, sound udder and great body capacity. She had already been made E and either had or was just about to finish her 100,-000 lb. record and was a top show cow.

One of the most striking examples of the great latitude Nature accords man, in breeding animals, is demonstrated in the canine field. Here, people working with Nature toward a definite end, have been able to develop hundreds of distinctly different breeds of dogs, from the extremely small animal that matures in a few months to the larger breeds that mature in almost as many years, all from a common source. We recognize in observing the laws of Nature that, a pup is a pup, not just a little dog, a colt is a colt, not just a little horse and a child is a child, not just a little man or woman.

What parent would not be worried sick if his 8, 12, and 17 year-old daughter had the conformation of a mature woman

at those ages, yet we, as Holstein Breeders, seem to want, above all things, to have our 10, 16 and 24 months old Holsteins to have the conformation of the 'True Type' at all these ages.

Working With Nature

As a Breed and as individual Breeders we are united in our belief that our 'True-Type' models of mature animals combine the ultimate in beauty and usefulness and the aim of practically every breeder is to breed and develop a herd of V.G. and E 100,000-lb. cows that are in their prime of life at 8 or 9 years of age. If that statement is true it is time we begin working with Nature toward that goal. How can we hope to attain that goal if we continue to favor the extremely early maturing animals (that history and experience show make unsatisfactory cows) for the first 3 classes in our show rings and sharply discriminate against the normal maturing young animals (that experience shows our great cows are developed from?)

How can we expect Breeders to breed and develop great herds of V.G. and E 100,000-lb. cows when we classify such cows good and Good Plus at 2 and 3 years of age and the early maturing kind (that seldom are satisfactory cows at 8 years old) V.G. and E at 2 and 3 years of age? We need to realize that Adolescence in our Holsteins is necessary and right instead of unnecessary and wrong. We need to pay more attention to 'length of body' in our younger animals instead of 'depth of body' because 'depth of body' in adolescent animals is the unmistakable badge of early maturity.

Nature is very kind to us in giving us a 'preview' of our mature animal at 4 months of age. Study your calves very carefully at that age then hope that they will go through a normal Adolescent period because that is the way great cows develop.

CONTESTANTS PICK WRONG COW

About half of the contestants picked the wrong cow in a production guessing contest on two Brown Swiss cows at Kentucky's Owen County Fair. One cow had a record of 12,200 pounds of milk in 305 days and the other one 7,800 pounds. Mrs. Thomas Poe picked the right cow and outguessed all other persons in estimating the difference in production. She won an artificially bred calf.

He Found His Fortune at Home

"Why rush off to the city? You may leave opportunity behind," warns Russ Nicoll . . .

Condensed from Farm Journal
Juliette Laine

IT WAS a bright spring day, and Russ Nicoll's little date stand on Highway 9 in southern California was busy.

Russ was inside doing a little cleaning and painting, and he was feeling fine—on top of the world. Suddenly he heard voices outside.

"There stood a bunch of surveyors with a transit, waving and shouting to some others about 1,500 feet away," Russ recalls.

Then came the blow. Nicoll's little palm-shaded stand would soon be stranded in the middle of a field—too far from the road even to be noticed. Each wave of a surveyor's arm seemed to signal the end of his life's work.

And it had been such a long time in the making. When Russ had come back from overseas after World War I, he had a wife, a baby daughter, a "big idea," and no money. So he went to work on neighboring ranches to build up a stake.

Almost ten years slipped by before he could scrape enough together to buy a strip of weedy, sandy desert land along the highway between Indio and the Salton Sea. But Russ wasn't looking at the land as much as the endless procession of cars racing up and down Highway 99.

He dragged a weatherbeaten 12'x16' shack back onto the land and hung up a sign: DATES, RETAIL AND WHOLESALE.

He'd spent every cent he had to get that land — didn't even have enough left to stock his stand with dates.

Finally he enticed a Coachella banker out to take a look at his strip of sand. The banker, H. A. Westerfield, surveyed the forlorn shack, then watched traffic speeding up and down the highway.

"We'll take a chance on you," he said at last.

The bank loaned the Nicolls $500, and they were in business.

Reprinted by permission from the Farm Journal, Philadelphia, Pennsylvania

Russ hung onto his ranching job, though, leaving the stand to Mrs. Nicoll.

But that first year was proof enough. They made $3,500! Russ quit his job, built a larger stand, and expanded his line with fancy pottery and arrow-weed baskets, brought in by Indians living nearby. Date palms and flowers soon were turning his weed patch into a shady, green oasis in the desert.

No wonder Russ felt that ruin was staring him right in the eyes that sunny day when he met the surveyors. But Russ and Mrs. Nicoll stared right back.

They had kept many of their customers' names in a guest book. And they figured that anyone who had liked their dates would go on liking them, no matter what happened to Highway 99.

So, Russ sat down and wrote letters, telling what had happened. He ended up saying that he was still in the date business —if they wanted any.

The response was astonishing. That first year they sold more dates *by mail* than they had ever sold over the counter. Now about half of the $200,000 to $225,000 annual business is by mail.

The Nicolls started experimenting with dates and Mrs. Nicoll came up with such tasty concoctions as date butter, date milk shakes, and date cake. Last year they sold about *20 tons* of the cake and that much date crunchie fudge.

They're even helping their competitors sell dates by supplying bakeries with date crunchies for making cakes and cookies.

Ice cream companies use date butter and crunchies for making a date ice cream. All of these products are made from dates that dry on the palms and are normally unsalable.

Date growers had sold their products in drab cardboard boxes for years. Nicoll put his into bright-colored one-, two-, and three-pound cellophane bags, and into attractive redwood boxes.

Sometimes he uses hand-painted gourd bowls, and metal containers of various kinds.

In a recent national packaging contest with more than 30,000 packages entered, Nicoll won two top awards.

Russ watches his mailing lists closely. He has taken more than 500,000 names from his guest book over the past 25 years. But he mails to only 40,000—the ones who frequently return orders.

"Anyone can do it," says Nicoll, referring to his success. "I was young and without business experience. I ran away from an orphanage when I was 12, so I'm way short on education, too.

"But I think roadside selling is *the answer for many of our young folks* who want to get into busi-

ness for themselves, and stay near home."

In his present building, Russ used some old railroad ties and bridge timbers that had bleached in the sun.

"That wood was really beautiful, and it added just the 'atmosphere' we wanted. Things like that are important—it's the looks and 'feel' of a place that builds success," he adds.

"Sure, you'll need imagination, but plain ordinary honesty is mighty important, too.

"I'll never forget my experience with the late E. A. Stuart, founder of the Carnation Milk Co. A big car stopped one day, and Stuart got out and started talking with me, sampling dates as he talked. He wound up ordering 150 of our most expensive packages.

If farmers gave their wheat away, a 21-cent loaf of bread would still cost the consumer 18 cents.

"When Mr. Stuart started to pay me, his driver thought I had figured the bill wrong—that it should be more.

"I finally convinced Mr. Stuart that the bill was correct, and this little thing started a friendship between us that lasted for many, many years.

"He taught me many things about business, one of the most helpful being the importance of dealing only in the very highest quality of products.

"If your product is good, customers will find you," Nicoll adds. "Our date shop is right out in the desert— it's 100 feet below sea level, and hot. But customers get to us, anyway."

Nicoll's customers surely do "find" him. Single mail orders sometimes total $18,000. Postage sometimes runs as much as $2,300 a day, excluding express shipments.

Maybe you're wondering what *you* could sell.

"I know one fellow," Nicoll will tell you, "Bill Graber of Ontario, Calif., who sells green and ripe olives. Woodrow Miller of Colton, Calif. sells wild honey at $1.50 a pound. And then, of course, there is Walter Knott, who started out selling berries and built his stand into the world-famous Knott Berry Farm Restaurant."

"Almost every part of the country has one thing that is can produce better than any other part," he explains.

"So, I say strike out for yourself. Give it all you've got. If these other fellows can succeed, so can you!"

More Ways To Use Electricity

New equipment helps you plan rewiring the farmstead . . .

Condensed from Kansas Farmer

Dick Mann

FOLKS on the farm are finding more and more ways to use electricity as new equipment comes on the market, and most new models of electrical equipment use increased wattage over old models.

These things have to be remembered when planning your wiring, so both wiring and outlets will fit your needs. Some new, heavy uses of electricity in the farm home are for air conditioning, heating and food storage.

In 1940, REA officials thought 150 KW hours per month would be a fair goal to shoot for in electrical use on the farm. Today it already is around 250 KW hours and is going up all the time.

Few farmers include enough circuits when they plan their wiring. You need a minimum of 2 circuits for a modern kitchen, plus a 220 circuit if you use an electric range. Another 2 circuits are needed in a utility room. If washer, ironer and dryer are added to kitchen you should have 4 circuits there.

Two circuits should be provided for the dining room. Three bedrooms plus a bathroom can be put on one circuit, usually, but you need another 2 circuits if you have a basement, and one spare circuit should be included for future expansion of use.

A modern farmstead needs a heavy-duty, portable extension cable that carries its outlet. You should plan convenient outlets at strategic points around the farmstead. You will need both inside and outside outlets for maximum use of electricity.

Window-type air conditioners are becoming popular now and probably will be used in an increasing number of homes until progress calls for central air conditioning. You need a separate 220 circuit for window air conditioners of the mechanical refrigeration type, even for the half-ton size.

It is difficult to get too many electrical outlets in the farm home. You need an outlet on every wall of every room. On

Reprinted by permission from the Kansas Farmer, Topeka, Kansas

large rooms you need one every 10 feet. These should be in locations easily accessible. One for each wall allows rearrangement of furniture.

There are new trends in home lighting to be considered The best way to get quality is with diffusion. You need a diffusion bowl or plate between bulb or tube and the eyes of the reader. This is true either for incandescent or fluorescent lights.

The modern trend, is toward more ceiling fixtures, especially of the recessed type, to eliminate so many lamps that take up floor or table space. You need to think of eliminating glare patterns. For maximum efficiency of lights, ceilings should be painted or papered in light colors.

Perhaps you never have stopped to realize how much you depend on electricity in your farming and living activities these days. We were amazed recently when we visited several farmers.

Henry Brown, a dairyman, has 4 electrical circuits at his milk barn alone. In it he has 2 milk coolers, pump, milking unit, hot water heater and lights. His house is completely electrified so far as household appliances are concerned. He uses a lot of electricity in his farm shop, would like to have an electric motor for his feed grinder. He also wants a hay drier.

Latest use of electricity on the Brown farm is for irrigation. An electric line was run to a well on the farm; a 15-horse electric motor was installed on the well. A control center near well contains an electric timing device that turns sprinkler system on and off automatically.

A portable electric motor is used by Mr. Brown for elevating grain and hay. In fact, with a heavy-duty extension cord, use of this one motor and elevator is spread over 5 farms. "I share hay equipment ownership with 4 of my neighbors," says Mr. Brown, "so we use this motor on all 5 farms." Even electric fences on the Brown farm are operated off electric system on farm.

Before he got his irrigation system, Mr. Brown's electric bill averaged $24 a month. His first month on irrigation, pump was operated 580 hours at a cost of $107. "I like the electric motor, however," says Mr. Brown, "because of its low upkeep cost."

At the Henry Shirar farm we found a good example of how additional demands bring rapid changes in electrical needs in the farm home. The Shirars converted a former pantry into a utility room, equipping it with automatic washer and dryer. Fortunately, they had provided for heavy increases in electrical use when the farmstead was wired quite a few years ago.

Mr. Shirar has his barn elec-

trified to a point where all his grain is handled by electricity. But use of electricity that pleases this family most is year-around air conditioning with a heat pump. A ½-horse motor operates a pump that handles 1,800 gallons of water an hour thru the system. In winter a unit removes heat from water to heat the home; in summer a second unit removes cold from water. Turning a couple of valves is all that is needed to reverse cycle and give year-around even temperature in the home. If they wanted to, the Shirars could reduce temperature in their home to 55 degrees, in winter could boost it to more than 100 degrees with conditioning equipment they have. Actually, they keep the house 20 degrees cooler in summer than outside temperature, as they find this differential most comfortable.

"Some years ago," says Mr. Shirar, "we thought we had to go to Colorado every summer to exist. Now, we don't even think about the heat as our home always is comfortable. For the year January 1, 1954, to January 1, 1955, the Shirar air conditioning cost $117.33. During summer, cost was only about $6 a month.

Even tho the Shirars anticipated heavy use of electricity in their home and provided 8 circuits at time the home was wired, all circuits now are full and, says Mr. Shirar, "we are wiring past some of them." They also had to make one change in their wiring to provide for heavier loads.

To give satisfactory operation over a long time the wiring system should be planned to be safe, adequate, economical and convenient.

If you follow those 4 points you will get maximum enjoyment out of electrical use on your farm.

AMERICANS NOT BEST FED PEOPLE

Americans are not the best-fed people in the world, according to Dr. A. D. Weber, noted Kansas stockmen. The people of Denmark, Sweden, Ireland, Switzerland, Australia and New Zealand get more calories, and people in 12 countries get more protein, he claimed.

If American teenagers got the meat they should get they would eat a billion pounds a year more than they now consume. Youngsters could readily eat 40 per cent more meat than their parents are getting. "Meat is the basis of a well-balanced diet from before birth throughout life," Dr. Weber says.

Reproductive Performance of Sows Improved by Alfalfa

Recent research proves the value of alfalfa in the ration of the brood sow . . .

Condensed from
Ohio Farm and Home Research

H. S. Teague

IT HAS been known for some time that factors supplied by alfalfa improve the reproductive performance of sows fed in dry lot. This knowledge has fostered the practice of including 15 per cent or more of alfalfa in the breeding gestation ration for swine.

Just why alfalfa causes this improvement and the manner in which these changes occur are not clearly understood. These factors, therefore, served as basis for a research project aimed at learning more about the physiological responses involved and the possibility of more intelligently setting up ration requirements of breeding sows and gilts.

Animals used in four experiments were selected from the Station herd and consisted mainly of Duroc gilts. They were carefully divided into two lots according to weight, breed and relationship. The use of 31 litter mate pairs and 5 pairs of half-sister gilts helped to reduce any variation caused by genetic differences.

Rations were formulated to contain 15 per cent crude protein. Lot 1 received a ration containing 18 per cent good to excellent quality sun-cured alfalfa. This was omitted in Lot 2, which received ground ear corn to more equalize the crude fibre level, also B vitamins and vitamins A and D in an amount calculated to supply twice the amount furnished by the alfalfa.

Each lot was fed the same amount daily so that an average weight gain of approximately one pound a day was maintained. The average feeding prior to breeding was 25 days.

Test animals were bred to either Duroc Jersey, Beltsville No. 1, Yorkshire or Berkshire boars. Each female was served only once

Reprinted from Ohio Farm and Home Research, Wooster, Ohio

during the heat period. All those not conceiving during the breeding period were slaughtered and examined for genital abnormalty.

After being weighed, all newborn pigs were classified as (1) strong and vigorous, (2) below average, and (3) weak and inactive.

The estrual (heat) behavior of those receiving the alfalfa supplement was not noticeably different from the behavior of gilts fed the legume-free ration. Of a total of 42 in each lot, 9 in Lot 1 returned to heat after the first breeding; 6 in Lot 2.

The difference in farrowing performance between the two lots is clearly indicated. Gilts which had received the 18 per cent alfalfa ration farrowed an average of 9.83 live and 0.87 stillborn pigs. Those on the alfalfa-free ration farrowed 8.64 live and 0.96 stillborn pigs. This shows a mean difference of 1.19 live pigs per litter, which is significant. Variation in litter size was similar. Neither vigor at birth, as classified, nor average birth weight appeared to be greatly affected by the two maternal diets.

There was a greater death loss of the pigs farrowed by Lot 2 gilts even though their weight and vigor at birth were apparently not adversely affected. Combining the results of all experiments, Lot 1 gilts weaned an average of 1.73 more pigs than gilts from Lot 2 or an increase of 0.54 pig over litter size in the two groups of pigs at birth. The greater loss of pigs from Lot 2 dams appeared to occur uniformly throughout the pre-weaning period. Autopsy findings did not reveal any association of symptoms causing the death of pigs with either of the maternal gestation rations.

The mean ovulation rate (discharging of eggs from ovary) of Lot 1 gilts slaughtered and examined during gestation was 13.5 compared with 11.9 for Lot 2. This significant difference suggests that the alfalfa ration may have had an influence on the ovulation rate, or that the legume-free ration had a depressing effect.

The number of live embryos recovered from Lot 2 gilts was greater on an average than from Lot 1 females. The mean difference, however, was markedly affected by a litter of one and another of two embryos obtained from Lot 1 females. The remaining 8 gilts possessed from 10 to 15 with an average of 11.9. The number of live embryos possessed by Lot 2 gilts ranged from 5 to 13, with 5 litters of 9 or less and an average of 9.7.

If it is assumed that those gilts which were slaughtered and examined during gestation are representative of those which farrowed, the difference between

the mean number of corpora lutea (each of which represents a discharged egg) in the ovary and the number of pigs farrowed can be used as an indication of prenatal survival. By such a comparison, 27.19 per cent of the eggs ovulated by alfalfa-fed gilts and 27.40 per cent of those eggs ovulated by gilts fed the supplemental legume-free ration are not represented by a live pig at birth. Since the two percentages are very similar, the greater number of pigs born does not appear to represent an increase in prenatal survival when alfalfa was fed.

In conclusion, it appears that the ration containing alfalfa furnished a factor or factors which favorably influenced ovulation rate and survival of the litter after birth. Moreover, this factor or factors was apparently absent from the legume-free ration or else was not present in sufficient quantity.

To the swine producer, these results demonstrate the value of feeding good quality alfalfa well ahead of breeding time if the greatest beneficial effect is to be realized.

GRADE YOUR FEEDER CATTLE

Feeder cattle command better prices if they're graded into uniform lots before being offered to buyers.

Paul S. Pattengale, Colorado livestock specialist, says most feeder cattle buyers look for uniformity in both type and size. Failure to sort feeders according to buyers' wishes may result in a lower price for the entire lot.

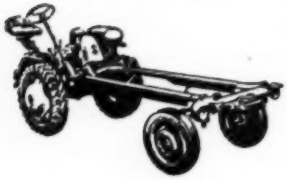
He points out that many cattlemen prefer to sell their calves on a straight run basis, thinking the good ones will help sell the poor ones. "However," he says, "it doesn't work out that way. Poor-quality calves merely pull down the price on the good ones."

Some cattlemen complain their cattle lose too much weight when worked into uniform lots. However, if they're handled quietly during sorting, then given a couple of days to fill, that weight is put back on before they're sold, Pattengale says.

As an example, Pattengale cites the case of a rancher who grades his cattle each year. Last year's cattle brought nearly 25 cents a pound for the entire lot of choice, fancy and good feeders, while other cattle in the area sold for 20 and 21 cents a pound when they were sold on a straight-run basis.

Colorado A. & M.

Verona's International Farm Fair



The United States' Exhibit at an Italian Fair attracted much favorable comment . .

Condensed from Foreign Agriculture
W. R. Ogg

ONE of the world's big agricultural shows is the international agricultural fair held every spring at Verona, in northern Italy. Here Italian and foreign firms exhibit what is new in agricultural equipment and farm machinery. And here many Italians and foreigners display their poultry and their horses, dairy cattle, beef cattle, and other livestock.

Many animals are sold on the spot during the fair, and many machines are ordered, as a result of the concenerated shopping the farmers do at fair time. As Verona's agricultural weekly paper remarked, many Italian farmers attend primarily "to get orientated; to see if there is a better tractor than the one their neighbor bought, or a machine with improvements not known in their region . . . No firm worth its salt would fail to keep this annual appointment at the Verona Fair. Above all, it gives producers a chance to look around at the competing output and to study the consumer's likes and preferences."

At the 1955 fair, the 57th in an uninterrupted series, more than 60 American firms presented exhibits of various kinds, and the United States Government presented an official exhibit, the first it has shown at any trade fair in Italy. One of the popular features of our show was a Corn Belt Farm in miniature, complete with buildings, machines, animals, gardens, and even a highway with a bus passing. Leaflets in Italian gave figures on production of crops and livestock and on costs and profits for such a farm. The other features of the United States exhibit were a cross-sectional plastic cow with moving parts that showed the operation of the "milk factory." Both cow and hen told their stories to visitors in Italian, through tape recordings. The cow stressed the advantages of hay in her diet. The hen urged her Italian cousins to demand a balanced diet and the best of management methods.

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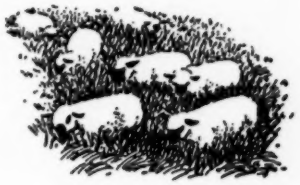
Caring for the Sheep Flock

A comprehensive manual prepared for Vocational Agriculture students on raising sheep for profit . . .

Condensed from a
Vocational Agriculture Service Bulletin



GOOD breeding, good feeding, and skillful care are required for a high yield of lambs.

A large number of lambs raised per ewe tends to lower production costs and increase profits.

The goal for fine-wools should be at least 100 lambs per 100 ewes, and crossbred and mutton types 125 to 150.

High lambing percentages are obtained by having prolific ewes and feeding and caring for the lambs to raise as many of them as possible. Ewes that do not lamb will not pay for their keep since the fleece is the only income from them. They should be culled.

Twinning is highly desirable and usually returns more income per ewe than singles. Individual twin lambs are seldom as large as singles for the first few months, but if properly fed, the difference in size usually disappears by the end of the first year. Selection of rams and ewes for prolificacy over a period of years will favorably influence the lambing percentage.

1. HOW SHOULD I FEED AND CARE FOR EWES AND RAMS?

Ewe and Ram Lambs

Feed and care for young breeding stock to keep them healthy and growing steadily, but do not allow them to get too fat. Size, growthiness, thrift, and good bone are more desirable than fatness. Young stock are usually allowed to run with the breeding herd. If good pasture is available, that probably will be sufficient. If the pasture is not so good or the lambs are poor in condition, supplement it with a small amount of oats or a mixture of oats and shelled corn.

The care of the animals during this period need not be elaborate if the animals are healthy and free from parasites. They should have shade during hot weather and sleeping quarters that protect them from cold and rain or snow.

Reprinted from Caring for the Sheep Flock During Breeding and Gestation, Vocational Agricultural Service, University of Illinois, Urbana, Illinois

Rams

Allow the ram the run of a grass lot where there is plenty of shade and water. Feed ½ to ¾ pound of oats daily and a small amount of legume hay, if the grass is short or dry. Ten days before breeding, begin to increase the oats to about 1½ pounds per day or change feed to 1½ pounds per day of a mixture of 3 parts corn, 3 parts oats, 1 part high-protein supplement.

Rams in heavy fleece should be shorn 4 to 6 weeks before the breeding season. Shear them all over, if they are to be used early in the fall. If this is not done, then at least shear the belly, scrotum, legs, brisket, neck and head. A shorn ram is more active; there is less probability of temporary sterility due to high scrotal temperatures; and it will be easier for him to breed a ewe.

Keeping the ram in fair flesh and as vigorous as possible throughout the breeding season will mean more uniform lambs because more ewes will be bred in a short period. Continue the grain feeding and avoid any practice which might cause the ram to become overheated. Avoid overexposure of a newly shorn ram to hot sun.

The feet of the ram should be in good condition at breeding time. If the hoofs are long or crooked, trim them with a knife. The hoof is easy to trim if the work is done after the sheep has been on a wet pasture or damp ground for a few hours.

Marking the Ram

When the ram is turned in with the ewes, some method of recording his activity and effectiveness should be used. A marking paint smeared on his brisket will indicate which ewes he has mounted. For the first 17 days, use yellow ocher and mineral oil, painted on every other day with an old paint brush; from the 18th to 36th day, use venetian red and the oil; and for the third 17-day period, use lamp black as the coloring.

If all, or a large percentage of the ewes are coming in heat the second or third time as shown by the pigment marks of red over yellow or black over red on the rumps of the ewes, another ram should be obtained. Failure to obtain a lamb crop may be avoided by using this manner of checking breeding activity though the lambs will be born late.

Recurring heat, however, is not always the ram's fault. The condition of the ewes and various environmental factors may affect their settling to service. Some sheepmen have reported difficulty in getting ewes to settle when grazing certain types of pasture, especially clover.

Number of Ewes Per Ram

Don't try to breed too many ewes to a ram. For a yearling

ram 25 to 35 ewes is sufficient, if he runs with the flock and has ordinary care. A 2 to 5-year ram, if in good condition, may be used on 50 ewes for pasture breeding if he is strong and well cared for. Best results are usually obtained when rams run with the flock if three of them are used for each 100 ewes. By hand mating, the number of ewes per ram can be increased materially, but because of the labor involved, this practice is not recommended for farm flocks.

Ewes

Have the ewes gaining in weight for 10 days to 2 weeks before breeding starts. This causes more of the ewes to come in heat at one time, a large number of reproductive eggs to develop at one time (giving a higher percentage of twins) and the developing fetus to get a good start toward a lusty, vigorous offspring at birth. This conditioning of ewes for mating is called "flushing."

Just before breeding time, remove any large locks of wool or dung tags about the tail and hind quarters of the ewes. While the ewes are caught, is also a good time to clip the wool around the eyes to prevent wool blindness during the winter.

Flush ewes by allowing them to graze on a better pasture than the one they have been using. Second growth meadows, rape, or new growth following the clipping of bluegrass are possibilities. If you lack suitable pastures, ½ to 1 pound of corn or oats daily or a mixture of the two will produce the same results. Use high-quality legume hay or legume-grass silage if pastures are poor and grain is not available.

The practice of flushing should be followed with caution. It is neither a cure for breeding problems nor a substitute for selection. New seedings, especially legumes, should be avoided during the breeding season, as there is some evidence that they may retard conception. Furthermore, it is not advisable to flush ewes that are already fat for it may increase the number not settling to first service.

No benefit is derived from an increased number of lambs born if the ewes lack the milk and mothering ability to feed and care for them. Do not flush very young or very old ewes because it is usually better to have them raise one good lamb than two poor ones.

2. AT WHAT AGE SHOULD EWES BE BRED?

There is some disagreement over the advantages and disadvantages of breeding ewe lambs during the first year. In most of the range flocks, ewes are not bred until they are 18 to 19 months old. This is also true in

many of the purebred flocks, especially show stock. In most of the farm flocks, however, the majority of the ewe lambs (except Merinos) are bred during their first breeding season and lamb when they are about one year of age. Merinos are not usually sexually matured enough to breed before 16 to 20 months of age.

Experimental work along this line shows that ewes bred to lamb at 1 year of age are generally not quite as large as unbred ones by the end of the second year. This stunting, however, is only temporary because by 2½ years of age, both groups are about the same size. There does not seem to be any effect on the amount of wool produced nor any ill effects on the body. The lambs from yearling ewes are usually smaller at birth than later ewes from either groups. In some experimental work at North Dakota, six year old ewes that had produced six lamb crops averaged 496.4 pounds of lamb per ewe, while those with five lamb crops averaged 465.4 pounds.

Ram lambs are sexually mature at 6 to 7 months of age and may be used to a limited extent during the first breeding season. Rams of that age should not be expected to breed over 5 to 15 ewes, depending upon their stage of development. If it is necessary to breed more than that number of ewes to a ram lamb, remove him from the ewe flock and turn him with them for an hour or two each day.

Give the ram lamb some extra feeding during the breeding season. A small amount of oats or a mixture of oats and shelled corn with pasture will be sufficient.

3. WHEN AND HOW SHOULD EWES BE BRED?

Time to Breed

The natural breeding season of sheep is in the fall of the year, from about the middle of August to the end of December. Ewes of the Dorset breed and some fine-wool ewes, however, may breed earlier than this and at other seasons. This period of gestation for ewes range from 145 to 152 days, averaging about 147 days for mutton-type sheep. If you wish to market lambs in June, they should be dropped in February or early March. The ewes then should be bred in September or early October.

Pen or pasture breeding, allowing the ram to run with the ewe flock, is the common method of breeding practiced with commercial production. With this method, a ram lamb should not be expected to serve over 15 to 25, and a mature ram 40 to 60.

Hand mating of ewes is not practiced with farm flocks to any great extent because of the

difficulty of finding the ewes that are in heat. The use of a "teaser" to find the ewes in heat is one way of overcoming the difficulty.

You may breed a slightly larger number of ewes per ram if he is allowed to run with the ewes only for an hour each morning and evening. This system is advantageous for a flock that is a little larger than that recommended for a ram or for an old ram or one that is out of condition and needs to have his strength conserved as much as possible.

4. HOW SHOULD I FEED AND CARE FOR THE PREGNANT EWE?

Feed

The statement is frequently made that sheep can utilize to advantage feed and pastures on which no other livestock can exist. That is true to a certain extent, but sheep that are improperly fed and cared for often produce disappointing results at lambing and shearing time. It is true that sheep can efficiently use large amounts of pasture and roughage and that they can more nearly obtain their total feed requirements from pastures and meadow crops than any other farm animals; but they still need some grain for maximum lamb and wool production. Pastures and rations for sheep can be simple, but they must be adequate.

Early Pregnancy

Pasture is a cheap feed for sheep so make generous use of it. After the ewes are bred, allow them to run on good pastures until about November 15 without supplemental feeding. If meadow or bluegrass pasture has been set aside for this late fall use, it will help to reduce the need for harvester feeds and also provide much needed exercise for the ewes. With the coming of snow or continued freezing weather, supplement the pasture with good legume hay or silage. Poor pastures may also need to be supplemented with a small amount of corn or oats for best results.

Middle Pregnancy

Make up the bulk of the ewe's feed after the pasture season with a good legume hay or grass silage. At this time, the requirements of the rapidly developing fetus are such that some grain should be added to the ration. Between breeding time and lambing, a 150-pound ewe should gain about 25 pounds to take care of the normal growth of the lamb or lambs and for the increase in the weight of the fleece that occurs. If the ration is properly balanced, you need not fear that the ewes will get too fat. In fact, pregnant ewes seldom get too fat, if they have plenty of exercise.

Silage, either grass or corn, is a suitable feed for pregnant

ewes; but due to its high moisture content should not be used alone. If fed in the proportion of 2½ pounds of silage to 1 of legume hay, it proves satisfactory as the roughage part of the ration. If corn silage is the only roughage, feed about ¼ pound per head daily of a high-protein supplement such as soybean, linseed, or cottonseed meal, pellets, or cubes. They should also have a mixture of equal parts of salt and ground limestone before them all of the time.

Late Pregnancy

At least a month, and preferably 6 weeks before the first lambs are due, add from ½ to 1 pound of grain or a concentrate mixture to the ration. The amount will depend on the condition of the ewes. If they are thin, feeding more than a pound daily may be advisable. The grain or grains necessary to produce desirable results depend largely on the roughages available. Some simple, but efficient rations are as follows:

	Pounds daily
Ration 1	
Oats, 5 parts	)
Sh. Corn, 3 parts	)
Bran, 1 part	) ½ to ¾
Linseed meal, 1 part	)
Corn Silage	) 2
Legume Hay	) 2
Ration 2	
Oats and shelled corn	) ½ to ¾
Corn Silage	) 2 to 3
Legume Hay	) 2 to 3
Ration 3	
Oats and shelled corn	) ½ to ¾
Legume Hay	) 2 to 3
Ration 4	
Oats and shelled corn	) ½ to ¾
Soybean meal, 80 parts	)
Fine limestone, 10 parts	) ¼
Salt, 10 parts	)
Corn Silage	) 6 to 8

Parts are by weight. To simplify the first mixture, you may eliminate the bran by adding another part of linseed meal. However, many sheepmen prefer some bran in the ration for ewes in late pregnancy because it is laxative and also high in vitamin E. The limestone in Ration 4 is to make up for a calcium deficiency.

To aid you in calculating your needs for hay and silage, ewes weighing 150 pounds will eat approximately 2 pounds of hay and 3 pounds of silage daily when these feeds make up the entire roughage part of the ration.

Exercise

If lambs are to be born strong and vigorous, a moderate amount of exercise is necessary for the ewes during the winter. Provide exercise by feeding some distance from the shelter so they will have to walk out to it, or by scattering the feed so they will have to move about to eat it. If winter

pastures are used, no other exercise is necessary.

Care should be taken to see that ewes are not forced to wade through deep mud or snow, chased by dogs, forced to jump over boards, or pass through narrow doors or gates. Forced exercise of this kind may cause ewes to lose their lambs and even death to themselves.

Ewes that are made to stay out in rain or wet snow may take colds or pneumonia. Dry snow, however, has no ill effects as the ewes readily shake it off.

Pregnancy Disease

Pregnancy disease, also referred to as before-lambing paralysis, acidosis, acetonemia, ketosis, and ketonemia, sometimes occurs late in the pregnancy period. If the disease occurs, the symptoms usually develop about a week or two before the ewe is due to lamb. The affected ewe is at first sluggish and then becomes unable to rise. Stiffness is usually noticed first in the hind quarters. Death often occurs within 4 to 7 days after stiffness sets in, but if the ewe delivers her lambs she usually recovers.

Pregnancy disease occurs most frequently in ewes carrying twins, are well fed but take little exercise, or that get sufficient exercise but receive a ration that is inadequate or unbalanced. Ewes running on good pasture, or are given plenty of exercise and a ration containing corn and legume hay seldom have much trouble with pregnancy disease.

LEAF ANALYSIS A FERTILIZER GUIDE

The day may soon come when growers will turn to a commercial leaf analysis service to gain the information they need in planning to fertilize their crops.

Research carried out by the U. S. Department of Agriculture on citrus and tung trees growing in Florida has shown that the leaves can reveal an inside story on plant nutrition. The leaves were found to be, not only food factories that transform sunshine, air, and water into plant food, but reservoirs of all the mineral food elements used by the trees in their growth and development.

In a far shorter time than would be required for fertilizer trials and soil analysis, leaves revealed deficiencies in needed food elements, and demonstrated the trees' ability to absorb nutrients in various forms and under various soil conditions. Leaf analysis also provided new information about the trees' needs for such minor elements as boron and molybdenum.

U. S. Department of Agriculture

REROOFING FARM BUILDINGS

Here are some practical suggestions for repairing or replacing farm roofs . . .

Condensed from American Agriculturist

E. W. Foss, Cornell University

DID the hurricanes give you roof trouble?

If a roof needs attention, perhaps these points will help you repair your roof or lay a new one.

What type of roofing should I purchase?

Many kinds of roofing are available—each designed for a particular type of structure and service. The length of service desired, the amount of slope or "pitch" of a roof, the ease of application, the weight per "square" (100 square feet), and the insulation qualities, appearance, and cost will determine which roofing you should select.

Are metal roofs a good buy?

Both aluminum and galvanized steel roofing are being used in increasing quantities. Galvanized steel will provide a lifetime of protection if painted whenever rust streaks become obvious—with a 2 oz. zinc coating per square foot providing 10 to 20 years of rust free service before painting is needed. Metallic zinc dust paints are a good material to apply to galvanized steel sheets.

Aluminum roofing may be used in about any locality—with the possible exception of areas exposed to salt ocean spray. Aluminum nails with neoprene washers are necessary for an application. Lightning rods and cables must be of aluminum to avoid electrolysis between the aluminum and a dissimilar metal.

Metal roofs may be applied over a slatted roof deck saving considerable expense in the cost of the structure. Metal roofing is recommended for roofs with a pitch or slope of 4" in 12" or more, particularly, for unheated buildings such as machinery sheds, hay and grain storages, etc. Metal roofs provide some reflective insulation but are in general poor heat insulators. When ap-

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plied on buildings near the dwelling — consideration should be given to objectional light reflection from the sun. The roofing should be applied in a manner prescribed by the manufacturer.

Would you recommend asphalt shingles?

Asphalt shingles have been a recommended roof covering for many years and are still a "good buy". Asphalt 3 in 1 strip shingles will give longer service than the "octagon" pattern, and can be expected to provide good service for 20 years. They must be applied with roofing nails long enough to go through the roof boards. Six nails are usually recommended per strip—and must be placed about one inch above, and each side of the base of the notches in the tab. Many shingles blow off due to a failure of nail placement. In areas of high winds, the lock-down type of strip shingle is preferred. Asphalt shingles must be applied to a roof slope no flatter than 4" in 12". Good strip shingles will weigh about 200 lbs. per square.

What about roll roofing.

One of the most popular roofings—due to its low cost and ability to be placed on all slopes down to 1" in 12"—is the "19 selvedge roll roofing". It is standard for poultry houses and other "nearly-flat" roofs. This material (like any asphalt roofing) should be applied on a warm or hot day. The upper half of the material is nailed according to recommendations, the tar or adhesive applied, and the next layer—"half lapped" over the nailed portion.

Are not other types of roofing good?

Yes—wood shingles, slate, tile, and asbestos cement shingles will all provide a serviceable tight roof if properly applied. Wood shingles require more labor to apply than either asphalt or metal roofs and have the disadvantage of being a fire hazard —reflected in higher insurance premiums (usually). Slate, tile, and asbestos cement shingles are somewhat more expensive initially, require more labor to apply, and are heavy—often requiring stronger roof framing.

Where and what is "flashing"?

Roof troubles are more common at changes in the roof line and at ridges, valleys, and particularly around chimneys and walls that adjoin the roof such as around dormers.

At all such points particular attention is given to securing a tight joint. Sheet metal is frequently used in valleys, around chimneys, and at the joint between wall and roof to secure a tight joint—the material for this application is called "flashing." The most common materials used are "valley-tin", aluminum, gal-

vanized iron, zinc, copper, and lead. Follow the plans available at your building materials dealer for the installation of all flashings.

Don't wait until your roof leaks before reroofing or repainting. An "ounce of prevention" here is well worth the "pound of cure" in terms of spoiled hay or grain, damaged framing, and other results of roof failure.

"Lepto" Causes Big Dairy Loss

Leptospirosis, a serious livestock disease, has cost dairy farmers an estimated $100,000,000 a year.

Commonly called "lepto", this disease averages a $2,000 loss every time it strikes a dairy herd, according to E. V. Morse, University of Wisconsin veterinary research worker.

U. S. Department of Agriculture figures show that lepto is the fourth-ranking dairy cattle disease—close behind mastitis, vibriosis, and brucellosis—in the nation. The most serious results of lepto in a dairy herd are milk production drop and abortions, according to Morse. The disease is seldom fatal.

Lepto, spread by slow-moving streams, infected animals, and human feet, can attack any farm animals. Common symptoms are high fever, sudden drop in milk production, and yellow, thick, bloody milk. The urine may also contain blood and there may be a jaundice visible in the whites of the eyes. Infected cows often abort around the seventh month of gestation, meaning the disease might be mistaken for brucellosis.

The disease will attack from 20 to 90 per cent of the cattle in a herd where it occurs. If you think there's a possibility of infection in your herd, call in the local veterinarian.

Morse advises farmers to vaccinate any newly purchased animals for lepto two to three weeks before bringing them into the herd, and buy only vaccinated animals at sales. Vaccinate show animals at least two or three weeks before sending them to fairs.

Wherever you see signs of lepto, isolate the suspected animals and burn the bedding. Bury any aborted fetuses, and don't feed any milk from infected cattle to calves, swine, or poultry.

Cattle will shed the disease organisms for about 90 days, while swine can spread the infection for a year.

Wisconsin College of Agriculture

Coming . . . . Plastic Bag Silos

Experiments with plastic enclosed stacks produce excellent silage . . .

Condensed from Crops & Soils

M. A. Sprague

THERE may be a new wrinkle in silage making on the farm, if experimental trials with plastics continue to show as much promise as they have in New Jersey during the past 4 years.

Plastic silos will probably not replace present-day structures, methods, and equipment. And, they may not be suitable on farms where large quantities of silage are required at a single location.

It seems likely, however, that plastic silos will meet a need which present silo-making methods do not satisfy. They are capable of providing a very high quality of silage for feeding in relatively small quantities, up to 75 tons. They can be used at off-season times and in out-of-the-way places where feeding separate groups of animals may be desired.

The greatest benefit in using plastic materials is gained from their gastight character. Quick-sealing after filling permits the rapid establishment and maintenance of anaerobic conditions inside the bag. These in turn prevent mold growth, limit temperature rise, hold dry matter losses to a minimum, and encourage the retention of carotene and protein.

The plastic materials most successfully used to date have been polyethylene and polyvinyl chloride sheet materials. Several other materials have been tested on a small scale. Some of these are very strong and offer considerable promise. Most of the experimental materials have been of 0.008-inch thickness. Thinner and cheaper materials are currently being tried.

Experiments were started at the Rutgers University College Farm at New Brunswick as early as 1951. These were exploratory, but they were encouraging enough to permit more detailed studies during the past two seasons.

It soon became apparent that a tight seal from the atmosphere is needed. Otherwise there is risk of large spoilage and dry matter

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losses. The tight seal is provided by a complete envelope of plastic.

In the spring of 1954, two experiments, each consisting of 24 100-pound bags of grass-legume forage, were undertaken on the farm. In these trials, such preservative treatments as molasses, sodium metabisulfite, carbon dioxide, carbon monoxide, ethylene carbodioxide, nitrogen gas, a partion vacuum, and no additive were tested. All gave good preservation and no observable spoilage, with the single exception of forage treated with ethylene gas.

That a high quality product was obtained in these small containers is significant, for the great pressures sometimes thought necassary were not applied. With no provision for seepage in these smaller bags, the moisture content of the lower layers was higher than desirable. However, in larger containers, where seepage has been permitted, this has not been a major problem.

Of particular interest is the prospect of reducing spoilage and dry-matter losses from the usual 15 to 30 per cent experienced on farms. In September 1954, eight plastic silos of 1000 pounds capacity each were filled with sorghum and an additional eight silos were filled with alfalfa.

The average dry matter losses in these containers were less than 5 per cent. Seepage from the containers was small. If it had been appreciable, dry matter losses would likely have been slightly higher.

There has been little heating of the silage in any of the plastic silos studied so far. The low dry matter losses may be possibly associated with the low temperatures during preservation. Thermocouples placed throughout the forage have indicated that the maximum temperature rise during preservation in any of the silos to date amounted to only 18° F. The average rise is only 9° F. In normal farm operations, the temperature rises sometimes exceed 40° F.

The small loss in feeding value and the high quality were demonstrated in another lot of 22 tons of third-cutting alfalfa. This was ensiled in September 1954 and opened in November. In the words of Samuel Stellatella, College Farm foreman, "There was not as much as a teaspoon of spoilage."

Feeding commenced at the top. The silage, for use in steer feeding trials, was expected to last approximately 5 weeks. The cattle liked it so well that the entire silo was fed out in just short of 3 weeks.

How to put the silage into a neat, effective package of appropriate size is very important. Much work remains to be done on this problem. So far, we have

tried eight basically different methods of building the stack, with varying degrees of success.

One of the most promising methods recognizes the ability of the chopped, fibrous silage to bind itself together. Accordingly, a round stack with nearly vertical sides can be built within a snow fence ring or other suitable form. In building such a stack, we presume the height should not exceed the diameter.

In one modification of this method, we first roll down the plastic bag like a stocking. It is then placed on level, smoothed ground and the form put into place. Chopped forage is blown into the form, and this first layer, in particular, packed evenly.

After the ring has been completely filled and the outer 3 feet well packed, it is removed, shortened to 2 feet less in diameter than the first ring, and mounted on top of the stack. The second layer is then filled, packed like the first, and followed by a third. After the top ring is removed, the plastic film is raised and tied tightly with a stout cord. In working with the stack, take care not to walk too close to the edge after the forms are removed.

Five silos, which range in size from 12 to 67 tons capacity, have been filled during 1955, using this general technique. All retained their shape.

Gases begin to collect immediately upon sealing, and the bag reaches its maximum extension in approximately 36 hours. After this, it slowly collapses. We have never had the plastic fail from gas pressure. However, unless tied firmly, the knot at the top may pull out. In case it does, it should be retied as soon as possible.

Openings should be made at the base of the bag on two sides to permit seepage. As soon as the seepage stops, these holes should be wiped clean with a dry cloth and covered with a piece of pressure tape, or gathered into a small knot and tied.

The plastic materials are strong and durable in the climate of New Jersey. No deterioration of the plastic has been detected due to weather or contact with the silage. The films are very susceptible to sharp probes and will puncture easily. A small piece of pressure tape forms an effective patch for such a break. Our silos have been fenced away from livestock.

Preliminary figures place the cost of 0.008-inch polyvinylchloride plastic, including fabrication for use in 30-to 40-ton packages, well within the practical limits.

Although silos of this kind appear promising, it should be emphasized strongly that their practical applications for the farm are, for the most part, unknown and untried.

Reducing Poultry Mortality by Breeding

Recent research brings new factors to light . . .

Condensed from Poultry Industry

Dr. Morley A. Jull, University of Maryland

MORTALITY takes too high a toll of growing chickens and laying flocks.

However, birds that die from disease are not the only cause of monetary loss to poultry breeders and egg and broiler producers. Many flock owners lose more money due to retarded growth, lower meat value and decreased egg production of many birds which survive the attacks of disease organisms.

There are three possible methods of disease control available to poultrymen. The first method is to employ whatever sanitary precautions are effective in controlling disease in general. The second method is through the use of therapeutic agents that are effective in controlling certain specific diseases. The third is breeding for resistance to disease. It must be admitted, of course, that some of the mortality that normally occurs in many flocks is due to diseases that are not wholly amenable to sanitation, immunization, and the elimination of carriers and exposed birds.

Newcastle disease is a relatively new disease in the United States and much still has to be learned concerning satisfactory means of control. The still newer disease, called "air-sac infection" has proved to be extremely difficult for the pathologists to diagnose and naturally satisfactory control measures have not yet been devised.

Whether or not a selection and breeding program can be developed to control these two diseases remains to be determined. Pullorum disease has been in this country for a long time and although the results secured at two state agricultural experiment stations indicated that a certain degree of resistance could be developed in a strain by selective breeding, the fact remains that apparently the most logical procedure of controlling the disease is to identify the reactors and remove them from the flock before the eggs are saved for hatching.

Ample evidence has been provided indicating that resistance to certain diseases is genetic in

Reprinted from Poultry Industry

nature. This in itself would suggest that it should be possible to breed for resistance to these diseases.

Although mortality due to excessive heat is not strictly a disease problem, it serves as a good illustration of differences among breeds with respect to their ability to resist unfavorable environmental conditions. Leghorns suffer much less mortality than general-purpose breeds when the temperature is excessively high. Also, high humidity still further increases mortality in the general-purpose breeds.

Two other cases have been reported concerning breed differences in viability: (1) Rhode Island Reds, Barred Plymouth Rocks, and White Plymouth Rocks have been shown to be more resistant to the roundworm, *Ascarida lineata,* than White Leghorns; (2) White Leghorns are known to be more resistant to the organism that causes pullorum disease than general-purpose breeds.

Another illustration of the genetic basis of disease resistance is the difference recorded in viability from hatching time to 21 days of age among certain inbred lines of White Leghorn chicks, depending upon the particular diet fed. One inbred line in particular was shown to be very sensitive to changes in the diet. The differences in dietary requirements are genetic in origin.

Breeding for Resistance to Disease

Since nearly all poultry flocks are affected by a few or several diseases, most poultry breeders would like to be able to breed for resistance to disease in general. On the other hand, if a certain disease is of major importance, it would seem logical to carry on a selective breeding program with a view toward developing resistance to this particular disease, hoping all the while that other diseases would remain relatively unimportant.

Although there is ample evidence indicating that disease resistance has a genetic basis, material progress in developing relatively resistant lines or strains of birds has been accomplished with respect to a single disease, fowl paralysis or lymphomatosis. The four types of lymphomatosis include the neural, ocular, visceral, and osteopetrotic or bone-infected types. The visceral type is of greatest importance to the poultry industry although the neural type is also relatively important.

Most of the work on breeding for resistance to lymphomatosis has been carried on at Cornell University and the U. S. Regional Poultry Research Laboratory. At both institutions material progress has been made in spite of the complexity of the problem. At the U. S. Laboratory, losses from

lymphomatosis to 600 days of age differed by over 40 per cent between a relatively resistant line and a relatively susceptible line after eight years of selective breeding.

At Cornell, losses from lymphomatosis between 42 and 500 days of age differed by over 30 per cent between a relatively resistant strain and a relatively susceptible strain after 11 years of selective breeding.

Research workers in California have shown that in the flock of White Leghorns whose records they analyzed there was a significant positive correlation between the heritability of resistance to other causes of death, and that resistance to total mortality was considerably more heritable than resistance to lymphomatosis.

The North Carolina Agricultural Experiment Station supplied evidence indicating the possibility of developing strains relatively low in pullet progeny mortality. In 1937 and 1938, several matings were made up for the purpose of determining any family differences in mortality. In 1938, the mortality of the pullets from 90 to 360 days of age was 23.3 per cent. In 1939, 1940, and 1941, matings were made up from among the families reared the previous year in which mortality was relatively high, and other matings were made up from families in which mortality was relatively low. In the accompanying data, the first kind of matings are called high-mortality matings and the second kind of matings are called low-mortality matings. The mortality data are based on pullet progenies from 90 to 360 days of age.

Mortality of Pullet Progeny of High-Mortality and Low-Mortality White Leghorn Matings, Respectively

Kind of Matings	Progeny 1939	Mortality 1940	% 1941
High-Mortality matings	34	31	28
Low-mortality matings	31	24	11

The data show that in each year the mortality of the progeny of the lower mortality matings was lower than that of the progeny of the high-mortality matings. In 1940 and 1941 the differences were significant.

The results discussed up to the present indicate that it is possible to reduce mortality by bdeeding, provided the breeders are selected on the progeny-test basis and enough families of sufficient size are available from which prospective breeders are selected. However, since egg production, egg size, hatchability, rate of growth, and other characteristics of economic importance must be considered by poultry breeders, it is apparent that progress in reducing mortality to quite a low level will probably be relatively slow.

Semi-Dwarf Trees for Shrinking Orchards

Smaller trees may be the answer to lower costs in the orchard . . .

Condensed from New Jersey Farm and Garden

Dr. Norman Childers, Rutgers University

BEST fruit is located in the top third of mature standard fruit trees. But it is the most expensive to harvest. Problem is this: how can we get at the best fruit more easily, not only at harvest time but during pruning and spraying?

This challenge has intrigued Europeans for years. They have been testing and growing dwarf and semi-dwarf trees because they are cheaper to handle and you can put more trees on fewer acres.

The New York Agricultural Experiment Station has been studying the merits of smaller trees. T. J. Maney has had test plantings at Iowa State College for many years. They seem to be making progress, but it is a long process filled with many pitfalls. Yet the challenge remains.

Easier Spraying

Even with our present air-blast type sprayers, we have found it difficult under some conditions to get spray material adequately delivered in the tops of tall trees. Thus, the top third tends to be the scab and codling moth nest. Tall trees are more expensive to thin and prune, although we have made great improvements in these two practices from the standpoint of hormone sprays and platform pneumatic pruning equipment.

So far, the very dwarf standard apple varieties which are grown on — for example — Malling IX rootstock appear to be much too small for commercial purposes. Semi-dwarf apple trees, which grow about the size of a standard peach tree, probably are the most desirable. With air-blast sprayers and pneumatic pruners, this tree can be handled efficiently and effectively. Thinning and harvesting are made easier, too.

A growing number of commercial orchardists in the East have been planting these semi-dwarf apple trees the past five years—obviously on an experimental basis. The growers I have

Reprinted by permission from New Jersey Farm and Garden, Sea Isle City, New Jersey

talked with seem convinced that this experimental approach is worth the gamble.

Most are basing their experiments on work done at Iowa State College by Dr. Maney. He has used a special dwarfing stem piece in the trunk, which he obtained from a seedling tree imported by a sailor from South America. This interstock or stem piece is identified as Clark dwarf stock, which Karl Brase, of the N. Y. Experiment Station, has described as being quite similar to, and probably, Malling VIII stock. Dr. Maney has indicated that this interstock makes a good union with most commercial apple varieties in the Midwest.

Extensive Grafting

In order to produce these trees in the Midwest nursery the Virginia Crab scion is grafted on a French Crab seedling and planted deep in order to encourage scion rooting. The trees are lined out in the nursery and grown for a year to five or six-foot whips. During the following winter a bench graft is made with a piece of the Clark dwarfing stock and with the desired variety, such as Rome or Starking, and stored for callusing until spring begins to open. This combination graft is in turn grafted onto the Virginia Crab whip tree in the field about 18 inches above the ground. The double graft usually makes a good union and the top develops well by the end of the second summer. The trees are then ready for transplanting to the orchard.

In the orchard, the trees are planted about the distance of or a little less than standard peach trees—15 feet apart in the row and 20 feet between rows, or 20 by 20 feet. They are set in the orchard 4 to 6 inches deeper than they grow in the nursery in order to encourage development of Virginia Crab roots and a gradual suppression of the French seedling nursery root.

This encourages the development of a sturdy, hardy and vigorous, widely-branched root system, according to results obtained under Midwest conditions.

Dr. Maney has found that this Clark dwarfing interstock system has developed trees that have withstood the relatively high summer temperatures in Central Iowa, the rather severe drought seasons of 1934 and 1936, and the Armistice Day, 1940, freeze through that area which killed a high portion of the standard apple trees.

The controlling of the top development of the standard variety is based on this interstock stem piece and thus is contrasted, according to Dr. Maney, with the reduced and restricted root growth frequently obtained with the Malling type rootstocks. Ap-

ple trees dwarfed by this interstock and growing side by side with the same variety on Malling rootstocks have excelled them in hardiness, productivity and practicability for commercial plantings.

These different trees are being supplied to the growers by a Midwest nursery at a cost a little higher than prices for standard trees. Malling stocks, in contrast, are still rather scarce and expensive and are difficult to get because of the cutting off of importation of these trees from Europe by quarantine action of the government.

First Yields Low

Apple trees with the Clark interstock, planted back in 1950, survived the relatively high Midwest winter temperatures of that year without danger while many of the adjacent standard trees planted at the same time had to be replaced.

Most commercial apple varieties when triple grafted as above have come into bearing in the second or third season in the orchard, but obviously the yield is low at first. At maturity the Starking, for example, has averaged around five boxes of fruit per tree of relatively high eating and appearance quality due to good exposure, limited vegetative growth, and ease of efficient management Also, cost of raising the apples plus harvesting costs are lower due to the small size of the trees. Relatively less pruning has been necessary because the early bearing tends to bend out the branches, forming good crotch angles.

This approach for lowering the cost of production of apples certainly is worth intensive study in the United States. It takes years, however, to evaluate fully how each of our standard varieties will perform under this triple-graft interstock system.

We know that apple varieties on certain of the Malling stocks respond differently in different sections of the country due mainly to temperature conditions. Growers may wish to test semi-dwarf trees on a limited scale, but until more experience and specific information are available it would seem questionable if moderate to large acreages of these trees should be planted, except on a gamble basis.

Meat Tenderness Shown By Bones — Tender morsel or tough cut of meat? Here's one way to help you tell. It's from Elsie Bamesberger, Pennsylvania State University. Red, porous bones speak of tenderness. These bones show that meat is from young animals, and the meat of young animals is usually tender.

Put Timber Sales Agreements In Writing

Pennsylvania study showed clear agreements in writing nearly doubled landowner's returns . . .

Condensed from Science for the Farmer

Carroll, Trotter and Norton

WHAT'S the value of a written sales agreement when selling forest products? It can mean nearly half again as much money for you.

That's what was indicated by a recent study of Pennsylvania forest product marketing practices and pricing process. The difference in returns between verbal and written contracts were:

Type of contract, Verbal; Number of Stumpage Sales, 16; Average Price per Thousand Board Feet, $19.44.

Type of Contract, Written; Number of Stumpage Sales, 17; Average Price per Thousand Board Feet, $28.46.

Every contract to sell forest products should be put in writing and a copy, signed by each party, kept by the seller and the buyer. A simple written agreement is sufficient and it is to the mutual interest of buyer and seller that this be done. Because standing timber is a part of land, the contract of sale must be in writing to be legally binding under all circumstances.

Sellers using verbal sale contracts not only received lower prices for their forest products, but they also had more difficulty enforcing the agreements. Good harvesting practices such as slash disposal, care of standing timber, and diameter limitations were more closely observed when written contracts were used. Sellers using written contracts of sale were better satisfied also with the compliance buyers gave to financial provisions such as time of payment.

The written sale agreement should be the end result of a carefully planned marketing program. Before the sale is made, secure at least a fairly good estimate of the amount of forest products

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Pennsylvania State University, University Park, Pennsylvania

available for sale. Thoroughly investigate local timber requirements and prices, since in many cases local markets pay better prices than outside markets because of the saving of transportation charges.

Inquire from neighbors who have recently sold forest products and use their experiences as a guide. Consult your county agricultural agent. Failure to do this in many instances has resulted in not getting full value for forest products.

After investigating how much you have to sell and the potential uses of your products, contact as many buyers as possible and find out what prices they offer for various forest products. Sellers who solicited bids from a number of buyers received a price over 30 per cent higher than sellers who sold after receiving an offer from only one buyer in the study.

Advertise the products you have for sale. Local daily newspapers are very good for this purpose. The expense will be small and the advertisement will help attract the attention of more buyers, thus assuring a number of bids.

Market individual species for specific uses. Sales of mixed species tend to have the price fixed by the lowest quality species marketed in the lot. The sales data from the Pennsylvania study indicated up to $23 per thousand board feet could be gained by sorting the products by species.

Grade Specifications

In brief, there are five general grades for hardwood logs: prime, select and 1, 2 and 3. Prime logs must be about 16 inches in diameter at the small end, 8 to 16 feet in length, and 90 per cent clear of defect. Select logs must be of same lengths and sizes with 75 per cent of length clear or 80 per cent usable for veneer. Grade 1 logs must be at least 10 feet long, 13 inches in diameter at the small end, with five-sixths of their length clear of defects. Grade 2 logs must be 8 feet long, 11 inches diameter at the small end, with at least two thirds of their length clear of defects. Grade 3 logs must be 8 feet long, 8 inches in diameter at the small end, with half their length clear of defects. Poorer logs may be ties or timbers.

All of these grades have more complicated specifications than indicated. Values may run from $100 to $300 per thousand board feet for prime logs to as little as $25 to $30 or less for grade 3 logs delivered at the mill. Since the minimum average cost of cutting and delivering logs is now between $35 and $40 per thousand board feet, the operator must figure on having the bulk of his volume at least in grade 2 logs.

SPOTTING THE BORDERLINE COW

An 18-point guide to culling your beef or dairy herd . . .

Condensed from New Mexico News

E. E. Anderson, Extension Dairyman

IT'S not always easy to spot the borderline cow—the cow in your herd that's right on the borderline of showing a profit or loss.

Under some conditions, a cow of this classification may be profitable to keep, at least temporarily. But under other circumstances she had best be sent to the butcher. But, you say, hold on here. "I've got a record on her and know whether she's making me a profit." What do you mean by a record? Do you know how much milk and butterfat she is producing and has produced over a long period? Do you know what the margin is between what you are getting for her product and what it cost to produce it? Do you have a complete health, breeding and calving record? If you have all this data, you're on firm ground. Complete records are the basis for practical culling. But even so, there are still some other related factors to consider before eliminating the borderline cow.

I think you will be interested in the 18-point guide for culling, prepared by Cornell University. If your answer is "yes" to most of the questions asked in the guide, culling is indicated. After reviewing the guide, I want to make some comments. But, first, here are the questions about the animals you might consider borderline.

1. If she is a first calf heifer, did she produce 30 per cent below your herd average?
2. In the first four months of her lactation, has she produced less than 130 pounds of butterfat?
3. Is her 305-day M.E. lactation record below the average of herd mates freshening during the same year and season?
4. Will she be dry 6 months or more?
5. Is there a replacement cow available?
6. Is she an old cow?
7. Does she have a record of mastitis?

Reprinted from New Mexico News, New Mexico A. & M. College, State College, New Mexico

8. Is she positive to Bang's disease test?

9. Does she have a record of breeding troubles?

10. Did she have complications after last calving?

11. Does she have a record of milk fever or ketosis?

12. Is space needed for fresh heifers?

13. Is the price of beef average to good?

14. Is she below the average type of your herd?

15. Is she a slow milker?

16. Is she a spring freshener?

17. Will it pay you to replace this cow with a higher producer?

18. Will it pay you to remove this cow without replacing her?

A "yes" answer to several of these individual questions may be sufficient justification for removing a borderline cow. Particularly is this true if her production is especially low. But before removing this cow that's just barely paying her board bill, let's consider what effect it will have on your income. On the face of it, a cow that's only paying for her feed is losing her owner money because feed costs are usually only about 60 per cent of total costs.

But, right now you're probably building next year's milk base. Unless you have a cow to replace this borderline animal, maybe you'd better keep her until the base-building period is over. Then, too, what effect will the removal of this borderline cow have on reducing production costs? Will the labor saved be used to advantage elsewhere? Until you can get another animal to replace her, maybe she's still profitable even though she's bringing in but a little above feed costs. On the other hand, her production may be sufficiently low that she should go even though there isn't a replacement.

Outside of the base-building and labor angles, you may find it advisable to cull cows that profit-wise appear considerably above the borderline class. What about the cow that will be dry four, six, or more months? Why the long dry period?

Does it mean that she is not a persistant producer, or did she have breeding troubles? Was the fact that she is hard to settle her fault? It is a well-established fact that difficult breeding is an inherited factor. Cows that carry such inheritance should be culled from the herd unless they are especially high producers. Replacement heifers should not be saved from such individuals.

It's poor management to perpetuate a cow family that fails to breed and calve at regular yearly intervals. Few things will put a dairyman out of business more quickly than failure to get his cows with calf regularly. It's impossible to maintain a fall

freshening schedule if there are breeding difficulties with many animals in the herd. And, in this connection, a borderline cow that is a spring freshener is a likely candidate for culling.

There are still other classes of borderline cows that should be considered for culling even though on first appraisal they seem to be well on the profit side. These are animals with a record of diseases such as mastitis and milk fever. Such ailments are not inherited but the weakness, which makes the cow more susceptible is. For instance, cows with weak udder attachments are very susceptible to mastitis and usually have a short milking life.

Then, there is the cow that carries the inheritance for a short life, regardless of strength of udder attachments or other type characteristics. Since providing replacements is one of the major expenses in dairying, it's important that a cow not only milk heavily, but produce year after year. It is only through a system of records that the life span of your cow families can be ascertained. As soon as it is determined that a cow family is short-lived, all members of that family should be culled should they fall in the unprofitable or borderline class. Replacements from such cow families should never be saved.

In summary, I'd like to emphasize that spotting the borderline cow is not always easy. Complete production, breeding and health records provide the basis for sound culling. Besides culling the cow for low production, other factors such as difficult breeding, susceptibility to disease, and short lives should be taken into account. During the base-building period, it may be practical to hold on to borderline animals that will be eliminated as soon as the period ends. The cow that is slightly more than paying her feed bill may be profitable temporarily until a replacement is available, unless by her removal the labor saved can be used to better advantage. However, we should keep in mind that if the low end of the herds throughout the country were culled out, there would be a shortage rather than a surplus of milk. Naturally, we should strive to spot and eliminate the borderline cow as quickly as conditions under which we operate our individual herds permit.

Average per capita income of the U. S. farm population was slightly higher in 1954 than in 1953, and only a little below the all-time high reached in 1951.

FARM PROCESS AND SELL DIRECT

With modern processing equipment, on-the-farm sales opportunities are unlimited . . .

Condensed from Electricity On The Farm
W. T. Ackerman

THERE appears to be a growing trend, on the part of more progressive farmers, toward direct marketing to the consumer. It is well known that this method, properly carried out, nets higher returns to the farmer and better quality products to the consumer with many farm-grown items.

This method also appears to be gaining in popularity with a considerable number of consumers. Presumably they are the more discriminating buyers who demand a fresh, high-quality product for their money.

While sales from the farm direct-to-the-consumer is not a new method, only in recent years has it been possible to process and preserve products on the farm to the high standard required by this method. 100% availability of electric power to all farm operations now makes this possible with sound economic benefit to the farmer. Coupled with this is the improvement in the mobility of the better class of customers. They all have automobiles and derive pleasure and relaxation from driving out to a farm and securing a better product.

While "wholesale" marketing of farm products, which is firmly established in most items, will always exist, there is little doubt that this bulk disposal method will always rate second place as far as freshness and quality are concerned. It is noticeable that an increasing number of farmers are selling as much as possible of their products directly to the consumer.

To operate on this direct marketing method involves certain obligations for the farmer. The following case examples of selected farms in Connecticut emphasize some of the important considerations involved.

There are three commodity groups — Poultry Products; Vegetables, Fruits and Flowers; and Dairy Products — where the direct-to-consumer marketing method has particular advantages and likelihood of good profits.

The following case examples

Reprinted by permission from Electricity On The Farm, New York City

are confined to Poultry Products as sold directly from farms and will emphasize some of the important considerations involved. This particular commodity group also has the added advantage of having made direct farm sales a practice for many years.

Ledgelans Farm is owned and operated by John Olson, his wife, and their son, Bob. Their business (and it really is a business) is carried on totally at the farm, everything from the hatching of the egg to the final sale of the processed turkey. The Ledgelans Farm can provide the customer with a fine turkey for Thanksgiving, Christmas, or for any other festive occasion throughout the year. Many packaged birds are sold as gift packages during the holidays which, with regular year round business, keeps 3 trucks going at Ledgelans with deliveries made as far as 40 miles away from the home plant.

The firm raises 3,000 of the White Holland breed and 1,000 of the Broad Breaster Bronze variety annually. The poults are carefully grown in battery brooders for 2 weeks and then put into brooder houses (with outdoor porches) which are lighted with a 10 watt bulb at night to prevent stampeding. Some of the birds are dressed off at 12 weeks of age (about 10 pound size) while late-hatch birds are given the same treatment after 18-20 weeks. Olson's constant objective is to always make his turkey meat very tender and tasty. To accomplish this most all the birds are field ranged. They are protected by lights left on at all times during the night. An electric fence is used to keep away the foxes, with added protection gained by spreading crude oil in a thin line just outside the fence which works very well to keep "old man fox" where he belongs. The birds are all electrically debeaked and have the wing cord cut to prevent flying.

Processing of the birds is done on the farm. They are killed scalded, picked, and placed in ice water for about 4 hours. Then they go into a cooler at 30-32 deg. for 12 to 18 hours. After that, they are eviscerated, put through the packaging process, placed on freezer plates at 25 deg. for 24 hours, and then into freezer storage ready for marketing.

Tranquility Farms, owned and operated by the J. H. Whittemore Company, are located near beautiful Lake Quassapaug at Middlebury, Connecticut. Here chickens are raised and processed, along with ducks and turkeys purchased from other growers. Usually about 36,000 birds, in all stages, are being raised for market. All poultry sold is eviscerated, packaged and then quick-frozen. White and dark meats

can be bought separately, along with roasted chickens that are frozen. On week-ends, fresh roasted birds are available on order. Tranquillity Farms' chicken pies, either fresh or frozen, have a reputation that is hard to beat. Large volumes of fresh eggs are also handled.

All these products are marketed as a retail operation in the sales room located in the processing plant and by a fleet of trucks serving the area. Orders are also taken and delivered at the Dairy Bar in Waterbury, owned by the same company and operated by the dairy division. This dairy division is also a grower-to-consumer operation. Milk from the farm is processed at the plants located in Middlebury and at the Dairy Bar in Waterbury. Milk, cream, butter, cheese, and premium quality ice cream are retailed at attractive prices.

The aim of the Twin Spruce Farm in Washington, Conn., owned by H. L. Bache and managed by Ernest Lewis, is to furnish their customers with superior quality poultry products. Each year Twin Spruce Farm raises, processes, and markets 2,000 turkeys, 1,400 capons, and 1,300 pheasants which are all sold in a ready-for-the-oven condition. During the Thanksgiving and Christmas holidays about 1,300 turkeys are sold. Most of these are sold in the farm salesroom and several hundred are shipped on mail orders.

The results of retail selling, as carried on by the above farms and many others, points out the advantages to the farmer of this manner of selling. Also some of the important considerations for raising, processing, and selling are obvious. Quality is all-important and can be easily obtained through efficient methods and proper mechanization. Salesmanship in its various forms must be coupled with quality to make this venture a success.

WILL SOCIAL SECURITY UP FARM CREDIT?

Social security may have a profound effect on credit rating for farmers.

The fact that the value of social security benefits will be considerable for his family after a farmer dies can now be taken into account by bankers when they lend money, according to Dr. E. B. Hill, a Michigan State farm economist.

Hill also said that social security means that some farmers will retire earlier than before and pass the farm operation on to their sons. *Michigan State College*

LIGHTING YOUR POULTRY FLOCK

Lights can stimulate lay, boost growth, affect maturity, and influence feathering . . .

Condensed from Poultry Tribune

A. William Jasper

FOR many years, poultrymen have used artificial lights to stimulate a higher rate of lay in their laying flocks. This is usually done by providing enough artificial light during the late fall and winter months to give layers a 13 to 14-hour day.

It was once thought that the longer day permitted the birds to eat more feed and thereby increase production. It was later learned that this was not the case. Actually, the lights stimulated sexual activity in the layers which resulted in stepped-up egg production.

Growth Can Be Boosted

Recent research findings indicate that poultrymen can use lights to advantage for purposes other than to increase winter egg production. A research worker at Cornell University learned many years ago that the growth rate of chickens is affected by lights. But because this work was done with Leghorns, which were not considered to be meat birds, the findings were not put into immediate use.

More recent research at the Beltsville Agricultural Research Center indicates that the best growth rate can be obtained during the first 18 days of a chicken's life by putting the lights on for one hour and then leaving them off for three or four hours. This lighting cycle was followed 24-hours a day, and the birds had no additional light.

Experimenters at Kansas State College attained the greater broiler weights by providing two hours of daylight followed by two hours of darkness throughout the 24-hour period. These birds grew faster than those getting 12 hours of light and 12 hours of darkness.

Fall and winter-hatched birds start to lay about two weeks earlier than spring and summer-hatched birds. Some poultrymen would prefer to retard the maturity of their fall-hatched birds.

Reprinted by permission from the Poultry Tribune, Mt. Morris, Illinois

This would permit the pullets to reach a larger body size before starting to lay eggs.

A recent discovery at the University of New Hampshire has shown that all-night lights or 14 hours of light per day during the growing period will retard maturity for fall-hatched pullets. Providing light to retard sexual maturity is to be preferred to starving the birds.

A project completed at Rutgers University verified the idea that restricting the amount of light provided pullets all through the rearing period can delay their sexual maturity. January hatched Leghorn pullets were raised together for the first three months and were then divided into two separate lots. One lot was reared under normal daylight hours, which increased to 14 hours in June. The other lot was limited to eight hours of artificial light each day—with no natural light.

When the pullets were about 7½ months old, those raised under normal light were laying at a rate of 66 per cent, while those raised with eight hours of artificial light were laying at a 40 per cent rate. Then the latter group was given an additional six hours of light each day, making 14 hours of light in all.

Within two weeks, the birds that had been started with eight hours of light jumped up to 80 per cent production, and several weeks later reached 89.4 per cent. The birds reared with normal daylight reached a top production of 72.7 per cent, even when they were provided with 14 hours of light.

Influence on Feathering

It has been demonstrated that molting and feather growth are influenced by lighting periods. Of turkeys dressed at 28 weeks of age at Kansas State College those that had the least light had better feathering and fewer pins. The three lots tested were provided with 10 hours of light, normal daylight, and 15 hours of light daily. A pre-seasonal molt in tom turkeys was induced with the use of light by workers of the U. S. Department of Agriculture.

Many poultrymen have found that using 75-watt flood lamps illuminates the feeding, watering, and roosting areas better than ordinary light bulbs. This eliminates the need for having bulbs with reflectors.

How to Get More Winter Eggs

It was mentioned at the beginning of this article that winter egg production can be stepped up by using artificial lights. But oftentimes lights are not used properly for this purpose.

Artificial light can be provided in the morning or evening only, or in both the morning and evening. Providing artificial light at

both ends of the day is usually most desirable because it is easier to maintain a uniform lighting period. If the lights are turned on at 5 a.m., turned off at daylight, turned on again late in the afternoon, and dimmed at 6 p.m., a constant 13-hour day will be provided throughout the winter months.

Using lights in the evening as well as in the morning will require a 10 to 15-minute period when dim lights (some 10-watt bulbs) will have to be used. This will permit the birds to go to the roosts.

Bigger Cow Stalls Mean Less Injury

Bigger stalls in the dairy barn will mean less milk loss from cow injuries this winter, says Jim Crowley, Wisconsin dairy specialist. He says it's a safer bet to have cows in especially large stalls and use cow trainers than to have the herd cramped for space.

Stall size depends on the weight and girth of cows as well as the type of stall you prefer in your own barn. Comfort stalls and tie stalls need to be bigger for a particular cow than stanchion stalls.

Jersey cows, weighing 800 to 1,000 pounds need stanchion stalls 3 feet, 9 inches wide and 5 feet long. The same cows would need a comfort stall 4 feet wide and 5 feet, 3 inches long, or a tie stall 4 feet 3 inches wide and 5½ feet long.

Medium-sized cattle, such as Guernseys, require stanchion stalls 4 feet wide and 5 feet, 4 inches long. Comfort stalls for these cows need to be 4 feet, 3 inches wide and 5 feet, 7 inches long. In a tie stall, you'd have to build one 4 feet, 6 inches wide and 5 feet, 10 inches long.

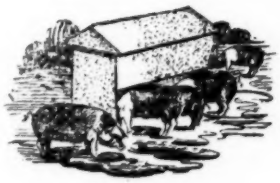
Stanchion stalls should be 4½ feet wide and 6 feet long for the heavier breeds. Holstein cattle would need comfort stalls 4 feet, 9 inches wide and 6 feet, 3 inches long, or tie stalls 5 feet wide and 6½ feet long.

Where there's a big difference in cow size within a herd, Crowley says it might be a good idea to make the stalls two different sizes—small stalls on one side of the barn and large stalls on the other. Then the first-calf heifers can stay in the small stalls and move to larger ones as they mature.

In any case, you'll need to use electric cow trainers with larger stalls. That will mean fewer sanitation problems, according to Crowley.

University of Wisconsin

PROGRESS OF THE INBREDS



This is the story of tailor-made swine . . .

Condensed from The Farmer

William H. Kirchner

IF YOU are a typical hog producer, your hogs are crossbreds. So are the hogs you see on neighbors' farms as you go to town. So are 80% that are marketed.

Twenty years ago you probably had one of the standard breeds—Durocs, Poland Chinas, Chester Whites, or one of the others. Then the ratio of crossbreds to standard bred hogs was reverse—80% standard breds, 20% crosses.

This change from straight breds to crossbred hogs came about largely as a result of a study begun in 1928 by Dr. Laurence M. Winters of the University of Minnesota's animal husbandry department. Results of the study were published in 1935. Publication of the results made this tall, relaxed, inquisitive scientist the focal point of criticism from purebred breeders across the country. Why? Because he upset a lot of notions about livestock breeding.

He declared that crossing of breeds results in hybrid vigor, and that out of hybrid vigor come larger, thriftier litters, gilts that turn out to be better mothers, and pigs that make gains cheaper and more rapid gains than straight bred hogs. Moreover, he contended; and this was what brought most criticism, offspring of crossbred sows mated to purebred boars would also show this hybrid vigor.

Commercial hog men tried this pork production recipe. It worked. That is why they shifted to crossbreeding.

And while they were shifting, Dr. Winters and men in charge of swine breeding at other experiment stations moved into the second step of the swine breeding project. That was tailor-making breeds that would fit into the crossbreeding program.

They are Minnesota No. 1, No. 2 and No. 3. Montana No. 1. Minnesota C Line. Maryland No. 1. Beltsville No. 1 and No. 2, and San Pierre.

Dr. Winters and his contemporaries didn't like the standard breeds with which they were deal-

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ing in their crossbreeding work. Too lardy, they insisted. Lard was as much a surplus problem then as now. They wanted meatier hogs. They also wanted hogs that would have all the other desirable characteristics . . . fast, cheap growth, early maturity, large, thrifty litters.

The Minnesota project started with development of inbred lines within the Poland China breed. "We wanted to concentrate within one breed," Dr. Winters says. "This seemed like a good idea, but even then I should have known better. By starting with then existing breeds, we were starting within a narrow range of characteristics. Setting up such a project is like setting up a football team. If all players are chosen within the city limits of St. Paul, for example, the chances are against getting the best possible players. Chances are broadened by bringing together the best players from St. Paul and Minneapolis. They are broadened even further by getting the best from several states.

"Despite knowledge of breeding then, the inbred Poland Chinas were selected for crossing at Minnesota and at Iowa State College. Durocs were chosen at Nebraska and Oklahoma."

But almost concurrent with the crossing of inbred lines of Poland Chinas, the first crossing that was later to become the Minnesota No. 1 breed was made. That was in 1936. The breeds involved were Landrace and Tamworth. A further cross of the two breeds was made in 1937, another in 1938. Then the purebreds were discarded. Since then no outside stock has been introduced in the foundation herd located at Minnesota's North Central Experiment Station, Grand Rapids.

In the 10 years following the first crossing to make the Minnesota No. 1, and prior to the breed's being introduced as a breed, the foundation herd at the North Central Minnesota Station averaged 9.3 pigs per litter; pigs weighed 211 pounds at 168 days, and reared on pasture they made 100 pounds of gain on 313 pounds of feed. After 17 years of inbreeding, the foundation herd is doing even better than it did the first 10 years. Running a recent test on 37 sows, the per litter average was 10.19 pigs; there were 8.84 pigs at 56 days; they weighed 44.26 pounds at 56 days; their 154-day weight averaged 198 pounds, and they ate 316 pounds of feed for 100 pounds of gain. The Minnesota No. 2 was developed to cross with the Minnesota No. 1. It is a Canadian Yorkshire-inbred Poland China cross, a black and white spotted, long-bodied, meat-type pig. In repeated trials, the Minnesota No. 1-No. 2 cross-

breds have been brought to an average weight of 200 pounds at 130 to 140 days, yielding 95% top-grade carcasses.

Newest of Minnesota breeds is the No. 3, now in its fourth generation. This work is being financed with funds from the Louis Hill Foundation of St. Paul, Minn. To develop No. 3's, Dr. Winters put into the mixture two breeds as unrelated to the Ones and Twos as possible. They were the Gloucester Old Spot, a minor English breed, and the Large White of England. Boars of these breeds, along with boars of the Welsh and Beltsville No. 2, were used on females of the C line Poland China's, the San Pierre and a few crosses of C Polands with Minnesota No. 1 and 2.

The first year's matings were made and recorded individually to get the foundation established as he wished it to be. In the second year, a new technique in breeding was introduced, the multiple sire system. Ten boars were put with from 50 to 70 females. This system is devised to make the most of natural selection . . . of encouraging survival of the fittest, of letting the weak and unfit disappear from the breed. The boars were permitted with the females for only one heat period. A female not settled then was marketed. Says Dr. Winters: "We do not want the offspring of shy breeders no matter how superior they may be in other respects."

Dr. Winters has been criticized for not using adequate checks on the animals produced. To this criticism he replies that the project itself constitutes its own check. Says he: "The first steamboat ran or it didn't; the first telephone conversation was carried or it wasn't. In like manner, these pigs establish their own record and it is good, indifferent or bad."

And it now appears that the record of the No. 3 is good. Crossed with Minnesota No. 1's and No. 2's, they are making a splendid showing. Last year 400 head of 1 x 3 crossbreds on the Stephan A. Osborn farm, Wabasha County, Minn., reached 200-pound weights in 140 days.

Another of the Minnesota breeds is the Minnesota C line in the process of development for more than 18 years. Originally, seven inbred sows were developed. Lines from these were reduced in number until now only the one remains.

The Montana No. 1 was developed at the United States Range Livestock Experiment station, Miles City, Mont. It is built on a foundation of Danish Landrace and non-belted Hampshire. It is a black hog which has performed well, especially when crossed with other inbreds of unrelated origin or with

straight-bred hogs.

Maryland No. 1, an inbred line was started in 1940 by officials of Blakeford Farms, Inc., Queenstown, Md., in cooperation with the USDA experiment station at Beltsville, Md., and the University of Maryland. Start was with 10 litters farrowed out of purebred Berkshire sows bred to Berkshire and Landrace boars. There were nine litters totaling 69 pigs out of these matings.

Following the first cross, the gilts were backcrossed first with a Berkshire, then the backcrosses were bred to a Landrace boar. Since then, all matings have been made within the line, and development of the breed has come of using three or four selected boars and between 15 and 25 sows per season. The breed is black with some white spots, not as long as the Landrace, but longer than the Berkshire.

The Beltsville No. 1 is an inbred developed at the Agricultural Research Center, Beltsville, Md. A total of 38 Landrace and 5 Poland Chinas are the foundation of the line. Following the first generation a number of the crossbreds were backcrossed to the Poland China, and these backcrosses bred, in turn, to Landrace boars. The plan of backcrossing to Landrace was continued to the point that the progeny carried 75% Landrace to 25% Poland China breeding. The line was closed in 1942, and matings since have been made within the breed.

Performance of the line is indicated by a 4-year feeding test involving a large number of pigs in which the average daily gain from weaning to 225 pounds was 1.42 pounds per day and under drylot conditions the pigs consumed 333 pounds of feed per 100 pounds of gain.

Beltsville No. 2, also a development of the Beltsville Station, is 58% Danish Yorkshire, 32% Duroc, 5% Landrace and 2% Hampshire. The breed was developed by crossing, inbreeding and selection with the line being closed to outside breeding in 1946. The pigs are red with a whitish underline and some have a few black spots. Because there is so little Landrace in Beltsville No. 2's make-up, they are especially well adapted to crossing with inbred breeds carrying a high percentage of Landrace.

San Pierre is a line developed on a farm owned by Gerald Johnson of San Pierre, Ind., by a former Minnesotan, A. B. Salmela. Foundation stock was a cross between Canadian Berkshires and Chester Whites, the latter from the herd of veteran Chester White breeder, John L. Olson of Nobles County, Minn. Stock was bred from within following the first cross. Ancestry of the San Pierre, differing from all other

inbred lines, breed is especially well adapted to crossing with other inbreds.

"For the purpose of recognizing, fostering and encouraging," according to the articles of incorporation, the Inbred Livestock and Registry Association was organized September 6, 1946. For the last full year of registration, 1954, there were 1,044 Minnesota No. 1's registered; 202 Minnesota 2's; and 901 Montana 1's; 123 Beltsville 1's; 110 Maryland 1's; 55 Beltsville 2's, and 55 San Pierres.

Record of performance recognition is carried on by the Association. There are seven ROP divisions, One-Star, Two-Star-A, Two - Star - B; Three - Star - A; Three-Star-B; Four-Star and Five-Star. To qualify for any one of the top three ratings, gilts must have produced 9-pig litters, sows 10 pigs. The pigs from gilts must have weighed 30 pounds at 56 days; from sows, 34 pounds. Total litter weight at 56 days must have been 300 pounds for litters from gilts, 350 pounds for litters from sows. Weight at 156 days must have been 190 pounds for the Three-Star-B and the Four-Star, 200 pounds for the Five-Star. Three-Star-B pigs must have made 100 pounds of gain for 325 pounds of feed; Four-Star must have made 100 pounds from 315 pounds of feed, and Five-Star must have made 100 pounds of gain from 300 pounds of feed. Additionally, to be accredited Three-Star or better, the animals must have passed inspection for type, and the only qualified inspector is one chosen by and representing the secretary of the association.

Common to all these inbreds, regardless of the breeds on which their lineage is based, is that they and their progeny, generation after generation, have been selected on the basis of litter size, weight at weaning, weight at 156 days, rapidity of gain and cheapness of gain. And no matter how well established a breeder may be, or how good his stock through careful mating and selection may have become, he is being urged to continue testing for these characteristics. Then when he sells a boar to a customer, the customer knows what to expect of the animal he buys.

Farmers who are using inbred breeds for crossing with other inbred breeds, or crossbreds or straight bred hogs in commercial herds are urged to select breeding stock from the best families of the inbred breeds, rather on the basis of an inbred boar's conformation or some other superficial characteristic. "Select a good doing family of the breed," Dr. Winters advises, "then stick to it when you have need for a boar of that breeding."

Have these several swine breeders completed their work? Have they added enough new breeds to American swinedom to adequately serve the industry? You get a vehement "No" from Dr. Winters in answer to these questions.

> The man who trusts men will make fewer mistakes than the man who distrusts men.

"Swine breeding," he declares, "is like the breeding of crops. We've had more than a dozen new kinds of wheat in the Red River Valley in the last 20 years, each one better than the one before. We are trying to improve on these pigs just as the plant breeder has improved on wheat. We already have three new kinds under test, Minnesota 1-A, a subline of Minnesota No. 1, and Minnesota 2-A and 2-B, sublines of Minnesota No. 2. We hope they'll prove enough superior to Minnesota Nos. 1 and 2 to crowd the two older breeds out of the picture. Improving these animals is our job."

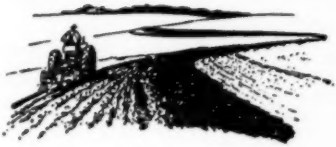
And as the work of improvement goes on, hundreds of boars and females, registered and non-registered, are serving in cross-bred herds throughout the country. Leaner, longer, thriftier, faster gaining market pigs are being produced.

IS GRASS SILAGE OVERRATED?

Grass silage is causing a lot of talk and study. That is a good way to get practical answers. Actually, corn silage may have less protein, but it has more weight per acre and is much higher in carbohydrates. To produce satisfactory gains, grass silage must be reinforced. About 8 pounds of corn and cob meal per yearling steer or heifer plus a pound of supplement and minerals will produce around 1½ pounds gain per day. The question then is whether you may as well feed the corn in the form of corn silage. If you feed grass silage, be sure to keep track as near as you can as to its value to you. The cost of storing either kind in any sort of silo or "pile" may ultimately prove to be about the same since possible heavy spoilage in "cheap" storage may actually be offset by practically no spoilage in so called "expensive" upright or concrete horizontal structures. In the long run it is wasteful to waste feed through spoilage after once produced. That calls for effective preservation and prevention of deterioration through the use of storage that actually stores instead of destroys.

Do-Well Agricultural Letter

CLIFF DOBSON'S "MEAT FACTORY"



Whatever you grow and wherever you grow it, you can apply Dobson's rules for success and get more efficiency and bigger profits . . .

Condensed from Farm Management

THE story of the Dobson Ranch at Mesa, Arizona, is a success story.

Dobson Ranch is unusually successful because its owner-manager, Cliff Dobson, is a good manager. His management is also unusual. It is based on principles and people, not on methods and things.

What Cliff Dobson has done, any better-than-average farm manager can do on his own place, wherever it is, whatever he grows. And if even an average farm manager applies Dobson's principles faithfully he can become better-than-average.

This desert-tanned westerner has spent hours studying the principles of good industrial management, and he has adapted them so well to the business of farming that his ranch is known in his community, throughout the state, and even in eastern markets, as "Dobson's Meat Factory."

Dobson's research and experience taught him that good industrial management is based on:

1) A sound, basic business policy to establish the goal or objective of the enterprise, and
2) Effective, clear-cut, well-

HERE IS CLIFF DOBSON'S 5-POINT CHECK LIST FOR ANALYZING THE EFFICIENCY OF HIS MANAGEMENT

1) Analyze your farm "factory" and pick the market in which you can produce best at lowest cost.
2) Train yourself and build a capable staff to carry out your program effectively.
3) Establish orderly production methods which follow a master plan.
5) Produce only the best products, market them aggressively.

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planned operating procedures to carry out that policy.

It is quickly apparent even to a casual visitor that Dobson has spared neither expense nor effort in building an organization and adopting methods to produce the best possible product his soil and climate can turn out. In fact, this is his policy, the point number one in his management program. In simple terms, it goes like this:

"To produce an honestly better product, at the lowest possible cost consistent with maintaining the productivity of our land, and to market it in a way that will produce a fair and reasonable profit."

If that sounds like dreamy double-talk, it is not. It is sound business sense the way Dobson applies it and he has his reputation in the market, his consistent production of prime quality animals, and his model farm factory to prove it.

Dobson believes that this matter of establishing a goal, a purpose, a statement of policy, call it what you will, is the most neglected phase of farm management. Too many managers of farms are so busy farming that they don't ever find time to think and plan, to weigh each move to see whether it will carry the enterprise toward its established goal in line with its policy.

The place for a farm manager's hand is on the throttle of his business, not on the handle of a hoe, says Dobson.

Dobson's policy will fit almost any farming enterprise, but in carrying it out each manager must adopt procedures that take advantage of the peculiarities of his location, soil, and climate; and, of course, his financial resources. If his land is marginal or short of water, he may be better off to gear his operation to make a profit from lower quality products less costly to produce, than by wasting money and effort trying to make average land produce premium crops.

Thorough Study

"The important thing," says Dobson, "is to take time out to think and manage your business. If necessary, to keep your policy well in mind, write it down and refer to it regularly so you will never lose sight of your goal."

On the matter of operating procedures, Dobson tells other farmers who visit his ranch to pick up ideas:

"How I fertilize or what mixes I feed or what methods I use won't help much, but if I can show you how we plan and what we accomplish by working out orderly management processes, your visit should be worthwhile. Each individual farmer must analyze his own conditions, breeds, feed supply, productivity

CHECK BEFORE YOU SELL TIMBER

A Louisiana farmer was offered $500 for his timber. He talked to his county agent who suggested that he have a farm forester look at his woods. Result — he sold about a third of his timber for $1,700. Crowded trees were thinned by removing high-quality "ripe" trees and defective and "weed" trees were cut out. He can sell again in 5 years and his timber will grow more productive.

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of his land, and markets and develop his own tailor-made program."

To help visitors get an idea of the management principles under which Dobson has worked out his program, he brings out a management organization chart which shows every supervisor where his authority and responsibility begin and end.

This is an essential, Dobson believes, because it clears up misunderstandings, lets every man know what is expected of him and to whom he should look for decisions beyond his authority.

To the man who is buying and starting to operate a new farm or who is looking over his present operation with a cold, appraising eye aimed at smoking out the weak spots in his program and strengthening the good points Dobson offers a five-point outline for analyzing efficiency of purpose and method.

1) Analyze your farm "factory" and decide in what field you can produce best at lowest cost.

This involves careful analysis, with the help of experts if you need it, of your land and facilities and what they can "manufacture" of the highest possible quality, in greatest volume, and at lowest cost. It requires evaluation of your own and your staff's know-how and experience. It calls for a thorough study of present and potential markets for each of the several crops you can raise. Market analysis nearly always calls for outside help, particularly from fellow-farmers who have had long experience in selling in each of your possible markets. And, of course, good management calls for evaluation of your ability to finance, either on your own or with credit help any undertaking you plan to tackle.

2) Train yourself and build a capable staff to carry out your procedures under your broad policy.

If you are a one-man enterprise, you will have to study and pick up knowledge and experience in the fields where you are short on know-how. In a larger

operation starting from scratch select your supervisors as carefully as you would select a partner. If yours is a going organization, put each man into a spot where he will be as much at home as possible. Don't try to squeeze a square peg into a round hole. If a man doesn't fit, get someone who does, or if he is indispensable better change your plan to fit him.

3) Select products to grow that fill a hungry market.

The best market may not be hungry for quantity; but it may pay you a premium for better service, better than average quality, or a standard product in a better package or form.

4) Establish orderly production methods which follow a master plan.

This may involve making necessary improvements in your facilities to bring them to peak efficiency. Feedlot design, mill capacity, utility buildings and even office procedures must be worked out to cut waste in time and expense.

Selection of the right equipment for each job is an important management function. Every machine should pay its way and earn more profit than any other tool you can select.

Consult regularly with your supervisory people and reach decisions promptly. If instructions are necessary, issue them before the work starts and make sure they are understood.

Planned Maintenance

One of the most important procedures on the Dobson ranch is a well-planned maintenance program aimed at keeping equipment in peak condition, buildings in good repair, breeding herds at top quality and soil fertile and productive. Dobson has never forgotten the advice of a harness maker who called at the ranch when he was a boy:

"You pay for oiling your harness whether you oil it or not."

Dobson has modernized this philosophy on maintenance. He says, "It costs just about as much to raise a poor crop as a good one."

To put it another way, Dobson insists: "You can't cheapen honest primary costs of basic operations. Discount and eliminate the frills, but land must be kept in top shape with ample manure and commercial fertilizer; the right amount of water must be put on the right place at the right time."

He has found that attempted short cuts or cutbacks in any department of his business leads to loss of quantity or quality in the final product.

5) Produce good products and market them aggressively.

The best example of how well Cliff Dobson has applied the principle in his fifth point of man-

agement procedure is his success with sheep.

Sheep are his number one product, both profit-wise and for their contribution to balancing the operation by making the best use of crops raised and returning fertilizer to the land.

Market Study

Careful study of national markets convinced Dobson that the most profitable product his farm factory could produce was milk-fed Easter, or spring lambs with wool as a by-product. He found his climate and location permitted him to market his lambs in April just as the season's last shipment is made from Imperial valley, California, the leading early spring lamb producing section of the nation.

Hitting the market at a time of low supply, plus the reputation for quality he has established, give him a consistently better than "normal price." Meat buyers throughout the country have learned that the firebrand "C" on the left side of a lamb's nose and the lazy flying "S" on the left hip of a steer mark an animal that is "honest." It is finished for condition more than weight, it will butcher out uniformly, and it will have more meat in the choice cuts. In fact, the Dobson brand is in such demand in eastern markets that most of his lamb production for the past two years has gone to the New York and New Jersey area and his cattle to the West Coast.

Employee Benefits

Dobson and his operating partner, Dwight Patterson, have built a model machinery and equipment shop to carry out their maintenance procedures. They have developed a push-button feed mill that can mix feed for 10,000 head with the labor of only one man. Then there are the concrete-lined irrigation ditches to conserve water, precast concrete feed troughs which are portable and cost less than those cast in place, the good comfortable housing and Christmas bonuses for year-round employees, the sprinkling of yard and roads near livestock to cut

The late Thomas Edison had many labor-saving devices on his summer residence, but there was one which visitors wondered about.

This was a turnstile that was so stiff it required considerable strength to force a passage. One guest asked Edison why he had everything so perfect except the stubborn turnstile.

"Ah," replied the host happily, "everyone who pushes that turnstile around pumps 8 gallons of water into the tank on my roof!"

down dust, and spraying to kill insects, both of which affect animal health.

"But these are not management", Dobson says, "they are the end-project of management. Anyone who works out a sound management program based on up-to-date principles will find that the decisions on details of his operations can be made quickly and without hesitation and as they come up.

Back of every good manager, behind his policy and procedures, there is a personal philosophy of business. Dobson's is improve, improve, improve!

The best weapon to use against hidden waste and excessive costs, he says, is to increase the salability of your product. "After all," he concludes, "the manager of any good factory is always trying to improve his product and make it better than his competitors. We have found it's a paying idea in a farm factory, too."

And when you are doing your improving, Dobson urges, do it right. As he puts it:

"In one way or another, one always pays for doing things the RIGHT way, whether he does so or not."

FARM CO-OP CREDIT PROBLEMS GROW SERIOUS

Too much "easy credit" is getting many co-op farm supply associations in a precarious financial position, according to University of Minnesota agricultural economists. Credit sales averaged about half of all sales in a recent study of 87 co-ops.

In 38 co-ops, 10 per cent of the accounts were more than a year past due and averaged 11 per cent of the total receivables. So many "over-age" receivables is dangerous, authorities say, because many become uncollectible. Unfortunately, most co-ops do not guard against bad debt risks. Only 33 of the 87 had a bad debt reserve fund.

Co-ops with a large credit outstanding generally had a poor financial position and low working capital. A poor credit program tended to result in increased operating cost and lower net profits. Not all of it's the customers' fault, however. Many co-ops do not make credit terms clear at buying time. An improved credit program should begin with a new credit policy set by the co-op's directors and manager, and patrons should be informed of it. Also, good records must be kept for better credit control.

University of Minnesota

New Ideas In Calf Raising

Tests at Washington State College compare different methods of housing, feeding and care . . .

Condensed from Guernsey Breeders' Journal

Dr. R. E. Erb and Prof. T. H. Blosser
State College of Washington

CHEAPER but satisfactory methods of housing and feeding young dairy animals is one way of reducing the cost of producing milk.

Using unsatisfactory methods, though they may be less costly, is no substitute if such methods result in high death losses, stunted calves and heifers, and delays in getting them into the milking barn.

One needs only to look around a bit to realize that calves survive in many kinds of shelter. The question is what is necessary and what isn't necessary.

Seven years age we became interested in calf housing requirements. Studies on housing, feeding and management have continued ever since. Information has now been accumulated on over 300 Guernsey, Jersey and Holstein calves.

Housing Experiments

Open shed housing was compared with conventional housing. The conventionally housed calves were raised in the calf maternity wing of the State College of Washington dairy barn located at Pullman, Washington. The altitude of this location is 2,500 feet, with snow falls up to 100 inches per year and minimum temperatures as low as 25 degrees below zero.

Much to our surprise, out of 57 calves raised in the open shed only one died. One case of pneumonia occurred and this in May. During the same time seven conventionally housed calves died out of 34 placed on experiment—one from pneumonia, two from scours and four from spasms. Growth rates were about the same, but feed required per pound of gain was slightly higher for calves housed in the open shed. Calves in the open shed were more active and stronger as the result of more exercise. They tended to gain faster after going off experiment.

Trouble from scours was less severe among calves housed in

Reprinted by permission from the Guernsey Breeders' Journal, Peterborough, New Hampshire

the open shed. The open shed pens were kept dry by addition of fresh bedding, but manure was not removed until the calves were removed from the pens at four months of age. Each pen was thoroughly cleaned and disinfected before bringing in another three-day old calf.

Guernsey and Jersey calves purchased from local dairymen were raised without loss in an open shed at the Western Washington Experiment Station. This area is near sea level, is much milder and has heavier rainfall.

Open shed housing appears quite practical for large areas of the United States.

Basic requirements for open shed housing are:

(1) Keep pens and calves dry by frequent addition of clean bedding.
(2) Face the open side away from prevailing winds to avoid excessive drafts.
(3) A building of airtight construction on three sides with the lower side open. The open side should not exceed four to five foot clearance.
(4) A minimum of 11-12 feet of calf pen under the roof.
(5) Minimum temperatures not lower than zero if high winds accompany cold and not lower than 20 degrees below zero if little wind accompanies the cold weather.
(6) Individual pens with partitions tight enough to prevent sucking of ears and tails. This precaution necessary to prevent frostbite.
(7) Outside exercise lanes should be long enough to provide ample exercising area.

Feeding the Dairy Calf

In feeding the young calf it is good to remember that we are dealing with an animal whose nutritional requirements are more like those of a simple-stomached animal than like those of a mature cow. Thus the diet of a young calf should contain high quality protein (such as is contained in milk) as well as the B complex vitamins. In the older animal quality protein and B complex vitamins in the diet are not so important, for the bacteria in the paunch can manufacture them. Young calves should also be fed diets which are easily digested, for at this age the calf cannot depend on bacteria for help in digesting fibrous feeds.

"The greatest single problem in agriculture today is not that too many persons are moving from the farms of the nation, but that so many farms are moving out from under the people."—Ferdie Deering

Whole milk or milk replacers? It is extremely difficult to improve on nature's method of feed-

ing calves. Thus, when someone tells us that he has a product which excels whole milk as a calf food, we are immediately rather skeptical. However, it must be admitted that the whole milk method of raising calves is rather costly, particularly when whole milk is fed for prolonged periods. For this reason various agricultural experiment stations and feed manufacturers in this country have developed products which are fed instead of the whole milk ordinarily used in calf feeding. These products are called milk replacers.

For economical use of wood preservative and timber, choose the smallest posts that will meet your fencing requirements.

Some dairymen immediately object to the feeding of milk replacers on the grounds that their use increases whole milk surpluses. It is important to remember, however, that most milk replacers contain at least 70 per cent of milk by-products, such as dried skim milk, dried buttermilk and dried whey. These products are also in surplus, and so by feeding milk replacers the stockpiles of these products are reduced. Many dairymen aware of the price-cost squeeze, are willing to choose a cheaper method of raising calves, providing that it is nutritionally sound.

In order to compare whole milk and a typical milk replacer for calf feeding, a trial is being conducted at Washington State College. Guernsey, Jersey and Holstein calves are being used as experimental animals. The formula for the milk replacer, which we call W.S.C. No. 1, is as follows:

Table 1. Percentage composition of a Typical Milk Replacer

	W.S.C. No. 1
	%
Dried Skim Milk	40.00
Dried whey	20.00
Dried buttermilk	10.00
Dextrose (cerelose)	7.68
Dried Brewer's Yeast	5.00
Oat flour	——
Wheat red dog flour	7.00
Lecithin	3.00
Apple pomace	7.00
Distiller's dried solubles	——
Irradiated yeast	0.10
Stabilized vitamin A (20,000 USP units/gm.)	0.22
Trace minerals	——

Chemical analysis showed the milk replacer to have the composition found in Table 2.

In this experiment, calves are permitted to stay with their dams for three days. They are then bucket-fed from an open pail. All calves receive whole milk when four and five days of age, but starting at six days, calves which are to be fed milk re-

placers are shifted gradually to the replacers. The milk feeding schedule followed is shown in Table 3.

At about a week of age a pelleted calf starter is placed before the calves and at about two weeks a high quality chopped alfalfa hay. Calves are permitted to consume the starter free choice up to four pounds daily per calf. The hay is consumed free choice.

In addition to comparing whole milk with a milk replacer, one-half of the calves in this experiment are receiving an antibiotic, aureomycin, in the form of an antibiotic feed supplement, Aurofac D. The calves being fed aureomycin receive it both in the milk replacer (or whole milk) and in the calf starter.

Our results to date show that up to weaning age the calves on whole milk gain at a somewhat faster rate (1.40 lb./day) than the calves on the milk replacer (1.19 lb./day). However, by 90 days of age, at which time the calves are removed from the experiment, there is much less difference between the calves (whole milk, 1.76 lb./day; milk replacer, 1.60 lb./day).

Our results to date led us to believe that calves can be raised very successfully, and much more cheaply, using a milk replacer. Comparative costs are as follows:

	Cost per cwt.
W.S.C. No. 1 Milk replacer (on a 90% dry matter basis	$11.00
Whole milk at $4.00/cwt. on a fluid basis (on a 90% dry matter basis)	$28.12

With the feeding schedule used in our experiment, and the above prices, the milk cost for the whole milk feeding system for one calf is $18.96 and the comparable cost for feeding replacer $6.46. This is a difference of $12.50 per calf. If you raise 25 calves per year, the saving by replacer feeding would amount to $312.50 per year. Many dairymen consider such a saving a sufficiently good reason for using milk replacers in calf feeding.

The antibiotic phase of this experiment thus far seems to agree with the results of experiments run elsewhere. At weaning age antibiotic fed calves had made an average daily gain of 1.37 lbs. as compared to 1.24 lbs. for calves receiving no antibiotic. By 90 days of age the difference was much less. Antibiotic fed calves gained 1.70 lbs./day as compared to 1.67 lbs./day for those calves receiving no antibiotic. The somewhat lower incidence of diarrhea in calves receiving aureomycin probably accounted for this difference. Our

experience, and observations in the field, seem to point to some value of antibiotics in increasing growth at an early age. However, antibiotics certainly should not be used as a replacment for good feeding and management practices.

In conclusion, we might say that feeding calves, like the feeding of older animals, requires some technical knowhow plus a liberal allotment of common sense. If both are used, calves can be fed correctly and economically at a considerable saving to the dairyman.

Table 2. Gross chemical Analysis of the Milk Replacer

As Fed Basis

	Dry Matter	Crude Protein	Crude Fiber	Ether Extract	Ash	N.F.E.
	%	%	%	%	%	%
W.S.C. No. 1	92.1	23.3	1.8	5.1	6.2	55.7

Table 3. Feeding Schedules for Experimental Calves

Days of Age	Replacer-fed calves		Whole milk-fed calves		
	Frequency of Feeding	Milk Lbs.	Replacer Lbs.	Water Lbs.	Milk Lbs.
		HOLSTEIN			
0-3	With dam	ad lib.	0	0	ad lib.
4-5	Twice daily	4.0	0	0	4.0
6-10	Twice daily	2.0	0.4	3.0	5.0
11-28	Twice daily	0	0.7	5.5	5.5
29-42	Twice daily	0	0.75	6.0	6.0
43-49	Once daily	0	0.75	6.0	6.0
50-90	Calf Starter—4 lbs./day plus alfalfa ad lib.				
		JERSEY AND GUERNSEY			
0-3	With dam	ad lib.	0	0	ad lib.
4-5	Twice daily	3.0	0	0	3.0
6-10	Twice daily	1.5	0.20	1.5	3.0
11-14	Twice daily	1.0	0.30	2.5	3.5
15-28	Twice daily	0	0.45	3.5	3.5
29-42	Twice daily	0	0.60	4.5	4.5
43-56	Twice daily	0	0.65	5.0	5.0
57-63	Once daily	0	0.65	5.0	5.0
64-90	Calf starter—4 lbs./day plus alfalfa ad lib.				

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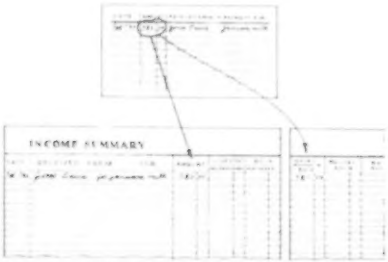

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